BIOLOGICAL EVALUATION
OF
THREATENED, ENDANGERED, AND SENSITIVE
WILDLIFE

Melvin Butte Vegetation Management Project

Prepared by:

Monty Gregg
District Wildlife Biologist

Author's Signature: _____/s/Monty Gregg_____

Date: _____09/17/15_____

A Biological Evaluation has been prepared in compliance with the requirements of Forest Service Manual (FSM) 2630.3., FSM 2670-2671, FSM W.O. Amendments 2600-95-7, and the Endangered Species Act (ESA) of 1973. A Biological Assessment (BA) was prepared in compliance with the requirements of Forest Service Manual (FSM) 2630.3, FSM 2672.4 and the Endangered Species Act of 1973 (Subpart B: 402.12, Section 7 Consultation, as amended) on actions and programs authorized, funded, or carried out by the Forest Service to assess their potential for effect on Threatened and Endangered species and species proposed for federal listing (FSM 2670.1).

Species classified as sensitive by the Forest Service are to be considered by conducting biological evaluations (BE) to determine potential effects of all programs and activities on these species (FSM 2670.32). The BE is a documented review of Forest Service activities in sufficient detail to determine how a proposed action may impact sensitive wildlife species, and to comply with the requirements of the Endangered Species Act.

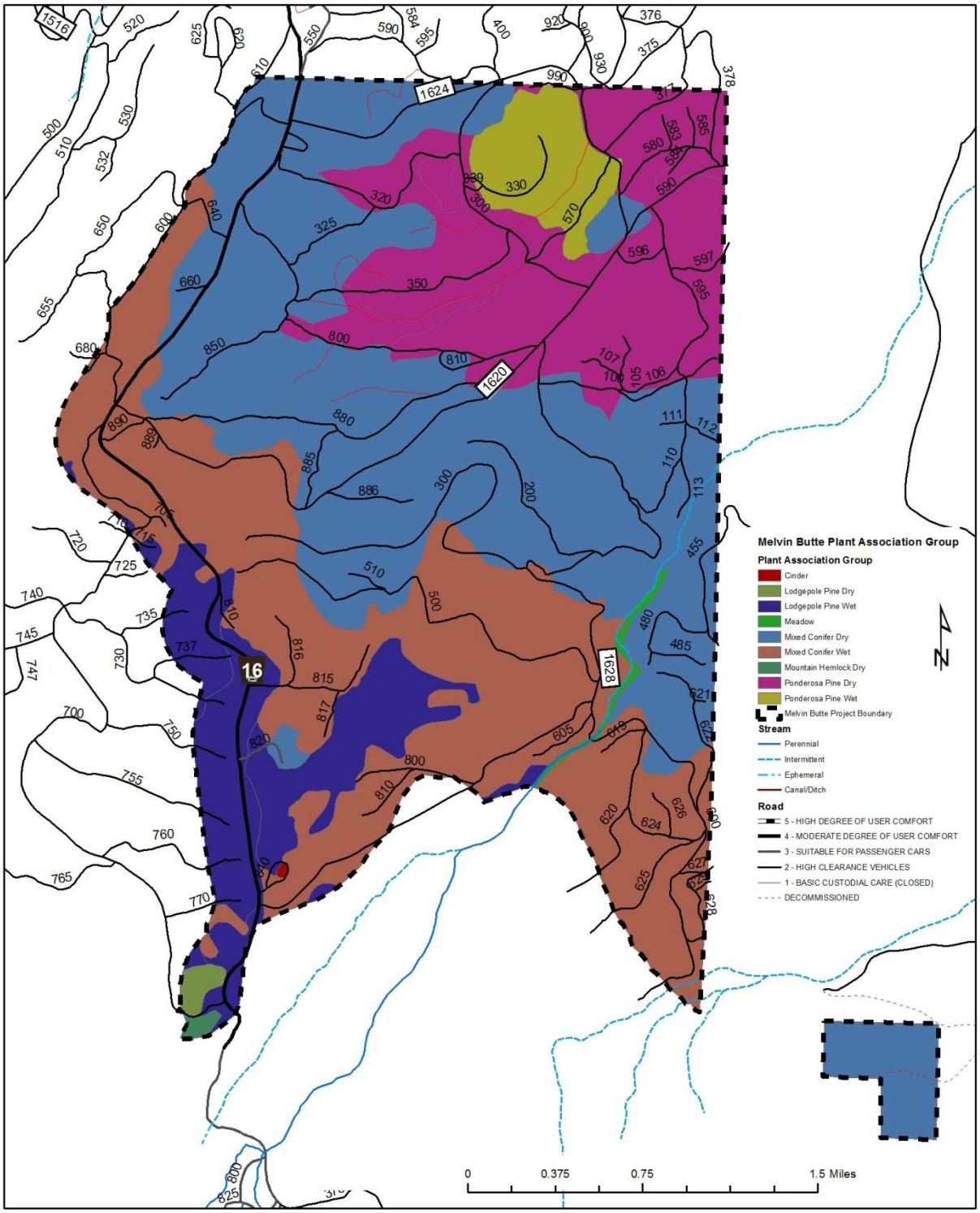
The Melvin Butte Vegetation Management Project area includes 5,375 acres of National Forest System lands approximately 10 air miles southwest of Sisters, Oregon in Townships T16S, R09E and T17S, R09E, and is adjacent to the western boundary of the 33,000 acre Cascade Timberlands property which is being considered as a future Community Forest. The project is on the south central portion of the Sisters Ranger District boundary.

The Melvin Butte Vegetation Management Project area occurs at the mid-elevations, ranging between approximately 4,000 and 6,000 feet. Plant associations were determined through field mapping of the potential natural vegetation using the protocol established by Volland (1988) and Simpson (2007), with input from the Area IV Ecologist and other Forest Specialists including silviculturists, ecologists, botanists and stand exam personnel. The associations and series were then grouped by their climax species, site potential, and temperature and moisture similarities into Plant Association Groups (PAGs), using the categories listed in the Deschutes WEAVE document (v.1.12) and are displayed in Table 1 and Figure 1.

Table 1 - Plant Association Groups

Plant Association Group (PAG)	Common Abbreviation	Lumped Plant Association Groups	Acres	Percent
Mixed Conifer Wet	MCW	MCW	1,571	29%
Mixed Conifer Dry	MCD	MCD	2,123	40%
Ponderosa Pine (wet and dry)	PP	PP	1,123	21%
Lodgepole Pine	LP	LP	531	10%
Mountain Hemlock Dry	MHD	MHD	8	<1%
Meadow	AMDW, MDW	MDW	18	<1%
Cinder, Rock, Water	CINDER, ROCK, WATER	NON-FOREST	2	<1%
TOTAL			5,376	100%

Figure 1. Plant Association Groups for Melvin Butte Vegetation Management Project



Although the topography is fairly consistent across the project, elevation increases from the northeast corner to the southwest corner. The major topographic features in the project area are Melvin Butte and Three Creek.

The project area lies within Deep Canyon Dam 10th field watersheds and entirely within the boundary of the Northwest Forest Plan.

The project area includes approximately 2,796 acres of GIS-mapped spotted owl dispersal habitat throughout the Melvin Butte project area. Of the identified 2,796 acres of spotted owl dispersal habitat the proposed action would treat and remove approximately 1,882 acres of dispersal habitat. Figure 2 displays the various treatments prescribed under the proposed action. No spotted owl nesting, roosting or foraging (NRF) habitat exists within the project area or within .25 miles of the project area.

In September of 2012, the Pole Creek fire started and eventually grew to 26,584 acres. This is one of many large wildfires that have affected the Sisters Ranger District since 2002. Between 2002 and 2013 approximately 40% of the district has been affected by wildfire. This has resulted in dramatic changes in the amount and quality of forested habitat on the district and a heightened awareness in the community to the potential effects of large wildfires. The potential risk from large wildfires to nearby communities was considered in this project.

When the Pole Creek fire occurred, the Sisters Ranger District was about to release a Draft Environmental Impact Statement for the Popper Vegetation Management Project, which proposed various vegetation treatments across a 17,192 acre planning area. The Pole Creek fire affected 6,545 acres of the Popper Vegetation Management Project Area (38%). Immediately after the Pole Creek fire, the district focused on developing a timber salvage sale within the fire boundary and left the remaining unburned portion of the Popper planning area for a future project. The Melvin Butte Vegetation Management Project represents the unburned portion of the former Popper planning area.

The Northwest Forest Plan (NWFP) allocations within the Melvin Butte Vegetation Management project Area are shown in Table 2.

Table 2: Melvin Butte Vegetation Management Project Area NWFP Allocations

NWFP Management Allocations	**Acres**
Matrix	5,209
Administratively Withdrawn	166
Total Project Area	5,375

The Melvin Butte Vegetation Management Project Area is within the *Cascade Forest Landscape Strategy Area* as described in the 2013 Whychus Watershed Analysis. The Watershed Analysis ranked the *Cascade Forest Landscape Strategy Area* as the #1 priority for treatment because of the recent loss of mixed conifer habitat that has occurred on the Sisters district, reduced wildlife connectivity, and the increased importance of the remaining spotted owl habitat.

Proposed Action

The purpose of this project is to maintain and restore resiliency and forest health in stands that provide habitat for interior forest wildlife species and present a potential risk of large scale wildfires in the Melvin Butte area. There is a need to reduce fuel loadings and forest vegetation density to lessen the risk of large wildfires to nearby communities and key ecosystem components, such as large old trees. Recent large wildfires have dramatically changed the landscape leaving the project area isolated and thereby increasing the urgency of protecting the remaining forest. The project area is currently at risk of stand replacement wildfire associated with insects, disease, and overstocking and is the only remaining unburned forest in the area. This project would also meet a need to provide wood products to the local and regional economy.

The proposed action includes vegetation management activities across approximately 4,442 acres (Table 3) of the 5,375 acre project area (about 82% of the project area). Actions include commercial and non-commercial thinning, slash-treatment, mowing, and underburning. Commercial thinning would occur on approximately 1,847 acres. No treatments will occur within Riparian Reserves. Thinning will move the area towards the historic range of variability for this biophysical environment, with ponderosa pine as the most common and dominant tree species. The project design follows the principles of fire-resilient forests: reducing surface fuels, increasing height to live crown ratio, decreasing crown density, and keeping large trees of resistant species.

Treatment types for the Proposed Action include thinning from below (HTH), mixed conifer thinning from below with group openings (MCGO), non-commercial thinning (P), burn only (B), lodgepole improvement (LPI), and dwarf mistletoe restoration (DM), Scenic Views Enhancement.

The timing of tree harvest could occur year round. Mechanical harvest occurring in winter and early spring may be restricted due to high soil moisture and lack of soil stability. Prescribe burning would most likely be accomplished in the late spring when fuel moistures decrease enough to burn.

Figure 2. Melvin Butte Proposed Action Alternative 2

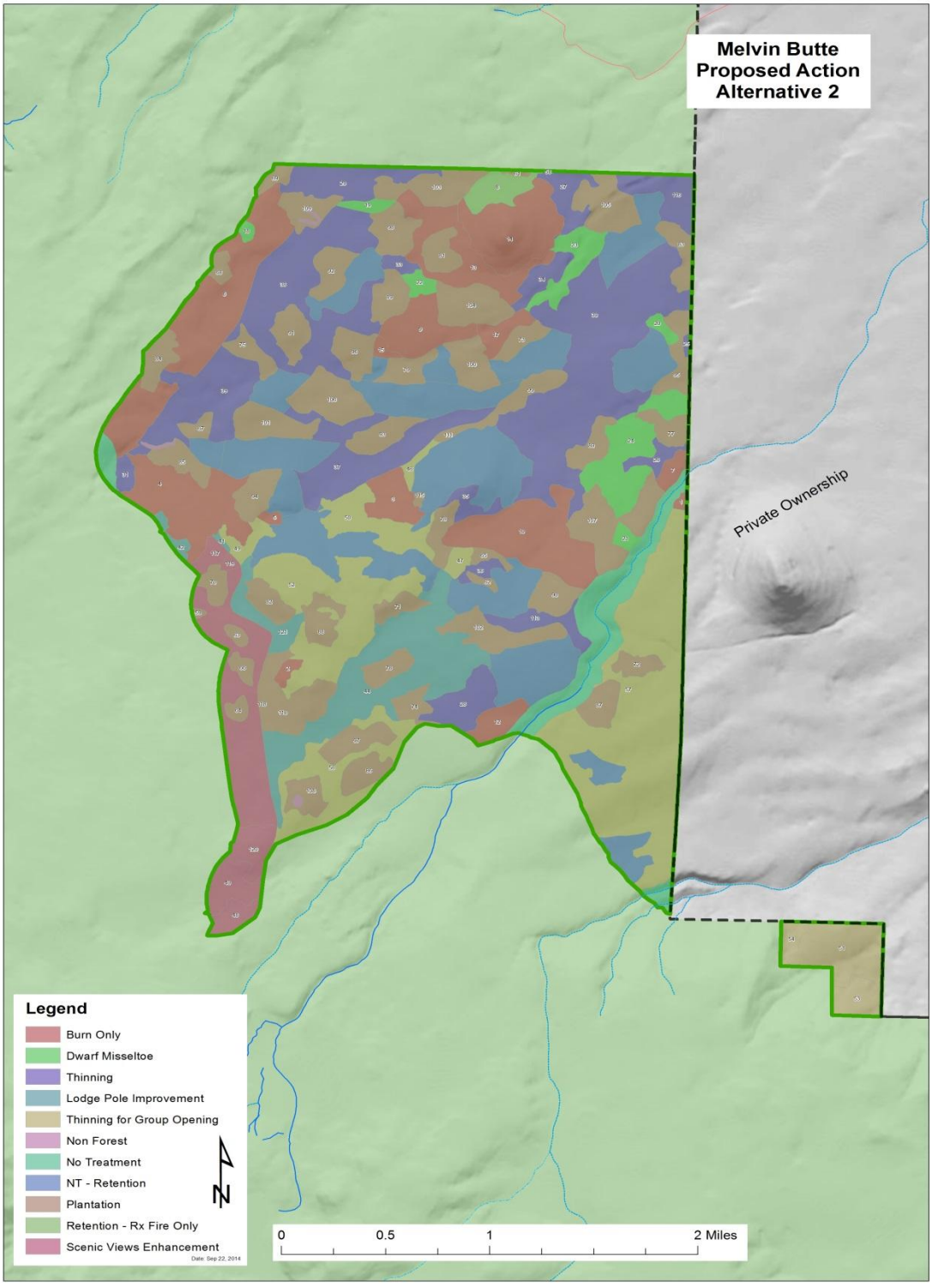


Table 3 summarizes the acres associated with each treatment type.

Table 3. Proposed Action Treatment Type and Acres for the Melvin Butte project area.

Treatment Type	Alternative 2
HTH	1,007 acres
MCGO	840 acres
P	1,180 acres
B	765 acres
LPI	249 acres
DM	160 acres
Scenic Views Enhancement	241 acres
Total Acres	**4,442 acres**

Thinning from below (1,007 acres): HTH-*The goal is to maintain fire climax ponderosa pine*.

Thinning would occur in the Ponderosa Pine and Mixed Conifer Dry plant association groups. These areas have a predominance of old growth or second growth ("black bark pine") ponderosa pine in the overstory with some small diameter ponderosa pine and white fir in the understory. Thinning would move multi-story late old structure stands to single story late old structure stands. Thinning would be completed with ground based mechanized equipment such as feller buncher or a cut to length machine.

- Treatments within the old growth stands would include thinning from below, mowing of shrubs, and prescribed burning.
- Thinning treatments in the second growth ponderosa pine would be based on variable density thinning (mosaic pattern). Variable density thinning attempts to replicate forests that have varying densities of trees created through natural ecological processes such as fire. Thinning in the second growth would include removal of some larger trees, mainly white fir, to create an uneven aged stand to provide for the long term sustainability of the stands.

Mixed Conifer Thinning from below with Group Openings (840 acres): MCGO-*The goal is to maintain and restore fire climax ponderosa pine*.

These treatment areas are predominately located in the mixed conifer wet plant association and are dominated by white fir. The two treatment types proposed are based on the relative absence or presence of ponderosa pine in the overstory.

Treatment Type 1: These areas have a moderate amount of residual ponderosa pine in the overstory with young white-fir/ponderosa pine ladder fuels in the understory. Treatments would include thinning from below, mowing of shrubs, and prescribed burning.

Treatment Type 2: These are areas where ponderosa pine is currently widely scattered, absent, or had been present in the past. Many of these areas had the overstory pine harvested with an objective of managing the white-fir understory or where pine was lost due to insects and disease.

To restore areas where pine is absent, group openings ranging from 1-5 acres in size would be created and planted to ponderosa pine. Created openings could be up to 30% in area of a stand. Where there is

some scattered residual ponderosa pine, small diameter trees would be thinned to protect the remaining overstory pine. Residual areas between groups and pine overstory treatments would not be thinned and would serve as dispersal and foraging habitat for various wildlife species.

Dwarf Mistletoe Restoration(160 acres): DM-*The goal is to maintain and restore ponderosa pine stands relatively free from mistletoe while recognizing the role that mistletoe plays in ecosystem function*.

These areas occur primarily in the lower elevations of the project area. All dwarf mistletoe treatments will include removal of the infected pine understory while leaving as many uninfected or lightly infected understory trees as possible, shrub mowing, prescribed burning and planting ponderosa pine in understocked areas. Overstory treatment types are based on the number of trees per acre and include:

Treatment Type: In stands with 4-14 trees per acre that are greater than 21 inches dbh (147 acres):

- Girdle the overstory trees to create wildlife snags, retain approximately 0.6 trees per acre to meet the Deschutes Wildlife Tree and Log requirements for ponderosa pine greater than 20 inches dbh; harvest the remaining overstory trees as wood products.

Non-commercial Thinning Treatment (1,180 acres): P-*The goal is to create more structurally diverse forests*.

Plantations in the Melvin Butte area are a result of past clear cutting or group selection harvest practices. Plantation treatments would include small tree thinning (trees primarily less than 8 inches dbh), pruning to remove mistletoe (removal of individual limbs of trees infected with mistletoe to remove point source infection), mowing of shrubs, and prescribed burning. The edge of adjacent stands would be treated to remove dwarf mistletoe infestations (e.g. pruning, small tree thinning, and girdling). Tree planting would occur in areas heavily infected with mistletoe where the majority of trees are removed. Thinning treatments would be based on variable density thinning sometimes referred to as a "mosaic thinning".

Burn Only Fire (765 acres): B-*The goal is to manage in-growth of trees, reduce fuels, and reintroduce fire back into the ecosystem*.

This treatment would be applied to 1) areas that have been previously harvested and that require understory maintenance burning. These area have minimal fuel loading and will primarily treat minor shrub and needle cast; 2) areas not conducive to mechanical treatment such as mowing and where fire would be used to meet stand objectives; and 3) use of prescribed fire to maintain fire climax ponderosa pine stands. This treatment allows for some small tree thinning and mowing, where appropriate, to reduce ladder fuels that reach into the crowns of old large trees and to meet fire management objectives. Fire effects would range from light to moderate burn intensities. There is only one unit associated with this treatment and it totals approximately 30 acres.

Lodgepole Pine Improvement Treatment (249 acres): LPI-*The goal is to create a mosaic of even-aged stands with natural appearing openings within the lodgepole pine, while providing a fuel break adjacent to Forest Road 16.*

Improvement cutting activities are primarily proposed in lodgepole pine stands that were affected by the mountain pine beetle outbreak of the 2000s. Improvement cutting is the removal of less desirable trees of any species in a stand of poles or larger trees, primarily to improve composition and quality. Trees will be removed where the majority of the overstory exhibits poor crowns and/or heavily-infected with mistletoe. These trees have poor growth rates and potential for infecting the understory with mistletoe is high. These stands would have fewer remaining overstory trees than in those stands that are thinned. The understory would contribute considerably to future growth. A series of patch cuts (approximately 5 acres each) would occur across the area to break up the continuity of the stands, creating a mosaic of even aged stands.

Treatment in the lodgepole pine plant association would provide a discontinuous fuel bed east of Forest Road 16 in support of the Wildland Urban Interface strategy. Within the Wildland Urban Interface stands would be continually thinned every 5 to 10 years to maintain a fuel break along the road.

Scenic Views Enhancement Treatment (241 acres): *The goal is meet the direction for the Scenic Views management area.*

This area experienced stand replacement fire during the 2012 Pole Creek fire. The area does not meet the long-term goals for the management area. The treatment is focused in the foreground area adjacent to and west of Forest Road 16. Treatment would consist of removing fire-killed trees to enhance scenic views by feathering the edges of fire-killed trees and leaving clumps of trees to avoid straight lines of sight along the 16 road. Green trees would not be cut. Logging debris would be disposed of through both machine and hand piling then burning piles adjacent to the road to meet standards and guidelines. The area would be planted with trees to help meet long-term goals for the management area.

There are no connected actions associated with the Proposed Action for the Melvin project area.

Travel and Access Management Associated with Melvin Butte Vegetation Management Proposed Action.

- Approximately 8.43 miles of Forest Roads would be decommissioned.
- Approximately 5.58 miles of Forest Roads would be administratively closed.
- Approximately 0.02 miles of Forest Roads would be converted to Level 2 (blocked road access).
- Approximately 0.80 miles of temporary roads maybe necessary to access stands for commercial treatments. If these roads are needed they would be decommissioned and restored after use.

Alternative 3

Alternative 3 was created based on key issues identified during public scoping. About 4,405 acres would be treated. Key issues used in alternative development include not constructing temporary roads to access treatment units; not creating group opening treatments in the Mixed Conifer plant association; and not removing large ponderosa pine in the dwarf mistletoe treatment. The IDT determined these key issues could be best addressed in a single action alternative.

This action alternative would convert group openings in the Mixed Conifer plant association to a thinning treatment; covert the dwarf mistletoe treatment into a thinning treatment; and does not require temporary road construction. The Lodgepole Pine Improvement Treatment, Plantation Treatment, Prescribed Fire Treatment, and Wildlife Habitat Retention Areas would remain the same as Alternative 2.

Figure 3. Melvin Butte Alternative 3

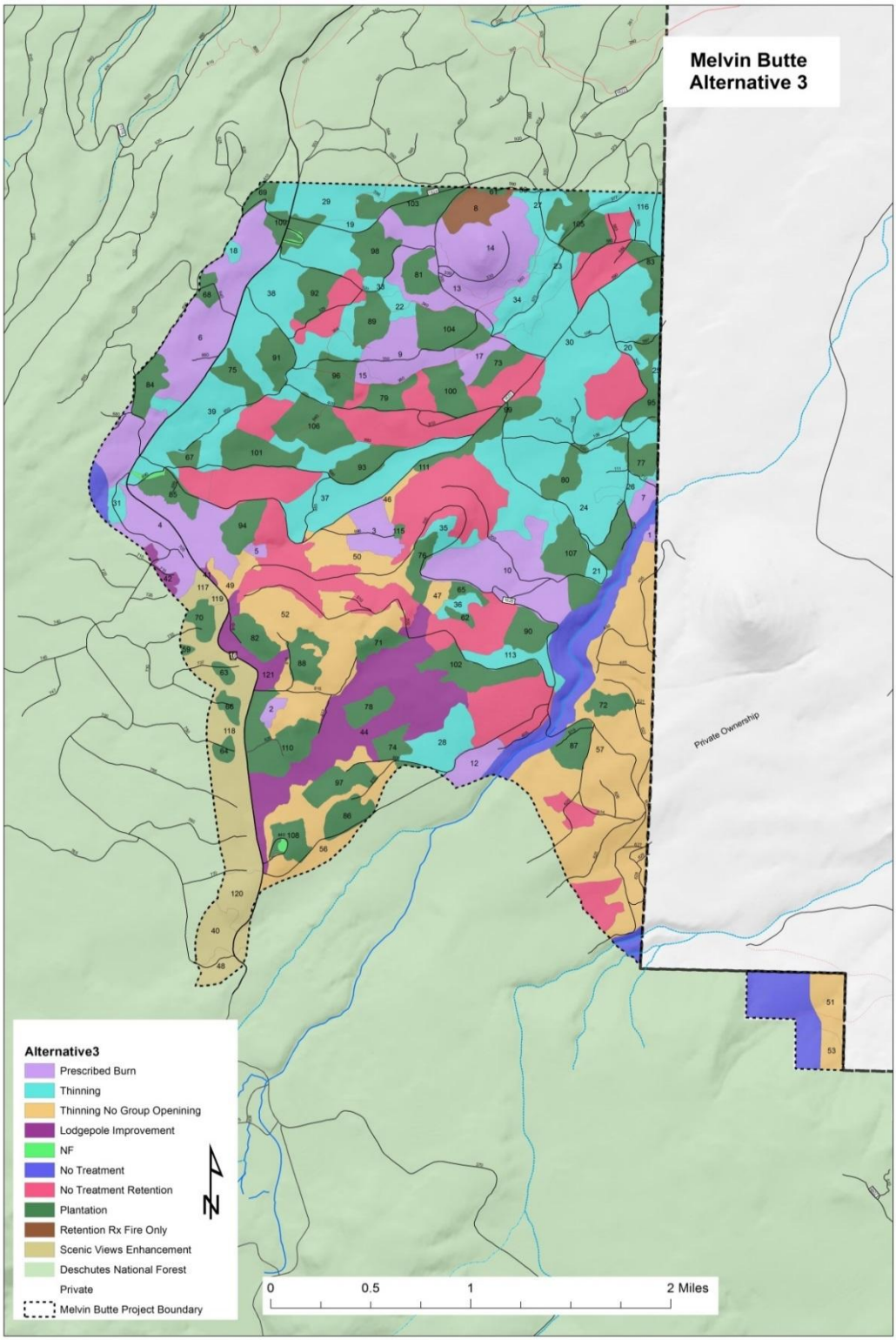


Table 4 provides a summary of proposed treatments.

Table 4. Summary of proposed treatments

Treatment Type	Acres
Lodgepole Pine Improvement	249
Plantation	1,174
Prescribed Fire	809
Thinning	1,164
Thinning without Group Openings	769
Scenic Views Enhancement	240
Total	4,405

Treatment Descriptions

The following treatments are proposed. Potential treatment units are displayed in **Error! Reference source not found.**.

Lodgepole Pine Improvement Treatment (249 acres): *The goal is to create a mosaic of even aged stands with natural appearing openings within the lodgepole pine, while providing a fuel break adjacent to Forest Road 16.*

This treatment description is the same as Alternative 2.

Plantation Treatments (1,174 acres): *The goal is to create more structurally diverse forests*.

This treatment description is the same as Alternative 2.

Prescribed Fire Only Treatment (809 acres): *The goal is to manage in-growth of trees, reduce fuels, and reintroduce fire back into the ecosystem*.

This treatment description is the same as Alternative 2.

Thinning (1,164 acres): *The goal is to maintain fire climax ponderosa pine*.

Thinning would occur in the Ponderosa Pine and Dry Mixed Conifer plant association groups. These areas have a predominance of old growth or second growth ("black bark pine") ponderosa pine in the overstory with some small diameter ponderosa pine and white fir in the understory. In many cases thinning would move multi-story late old structure stands to single story late old structure stands.

1) Treatments within the old growth stands would include thinning from below, mowing of shrubs, and prescribed burning.

2) Thinning treatments in the second growth ponderosa pine would be based on variable density thinning ("gappy/patchy/clumpy In some cases thinning would include removal of some larger trees, predominantly white fir, to create uneven aged stands to provide for the long term sustainability.

Thinning *without* Group Openings Treatment (769 Acres)**:** *The goal is to maintain and restore fire climax ponderosa pine*.

This treatment is similar to the Thinning with Group Openings as described in Alternative 2 but does not include group openings. While 820 acres are identified for treatment the amount of effective treated acres is expected to be 10%-30% less based on the lack of group openings. The effective acres treated would range from 574 to 738 acres. Specific stand conditions would ultimately guide the effective acres treated.

In mixed conifer stands that are dominated by white fir, thinning would occur adjacent to residual overstory ponderosa pine. Treatments would include thinning from below, removing young white fir/ponderosa pine ladder fuels from around the overstory ponderosa pine, mowing of shrubs and/or prescribed burning.

The total number of acres that would be thinned under Alternative is about 1,933 acres, but the IDT wanted to track the Thinning without Group Openings treatment separately as this treatment type was an issue raised during scoping. For simplicity of analysis, the thinning acres were combined in the Forest Vegetation section of the environmental assessment.

Scenic Views Enhancement Treatment (240 acres): *The goal is meet the direction for the Scenic Views management area.*

This is the same treatment as Alternate 2. Alternative 3 contains two non-significant Forest Plan amendments.

A number of connected actions are associated with Alternative 3:

- About 8 miles of Forest Roads would be decommissioned
- About 6 miles of Forest Roads would be administratively closed
- Reconstruct a curve radius of a section of Forest Rad 1628000

Logging systems and post-harvest treatments are the same as Alternative 2 (Proposed Action).

Introduction to Wildlife Effects

The following Biological Evaluation for Threatened, Endangered and Sensitive Species (TES), have been incorporated in their entirety. The Zone of Influence for discussion on cumulative effects is bounded by the project area for all species. The area of influence includes overlap with existing conditions such as roads, trails, and past management activities.

This section includes discussion on data used, methods, models, general assumptions, evaluation criteria and a summary of effects. General effects are discussed in this section. General effects cover broad categories of species and those effects that are common to all alternatives including the no action alternative.

Recently completed surveys and historical data were used in determination of species occupancy within the Melvin Butte project area. Incidental species observations have also contributed to the knowledge of species presence within the project area and/or Sisters Ranger District. Potentially suitable habitat is considered to be occupied.

ACE Model (Action/Change/Effect)

The long-term sustainability of forest ecosystems and wildlife habitat is dependent on a variety of factors, but the purpose and need of this project identified that due to fire suppression and existing conditions from past management, stands are over-stocked and outside the Historic Range of Variability (HR). HRV is used to determine the desired future condition for wildlife habitat as it relates to each Plant Association Group, and what management action is needed for departure from the existing condition to continue to promote future wildlife habitat. Forest thinning and fuels reduction treatments are the two main treatment types that would occur to move stands toward HRV and have the potential to impact existing wildlife habitat in the short-term. Removal of habitat from these management activities could directly or indirectly affect wildlife species and their habitat. An evaluation of the potential effects to wildlife species will be completed for the project to determine if these effects are negative or beneficial.

Duration and Degree of Impacts (Short-Term vs. Long-Term)

Under each action alternative, the project would primarily manipulate vegetation through a variety of thinning techniques. However, stands may also be treated by use of prescribed fire or a combination of thinning and prescribed fire. In addition, some treatments may not directly impact habitat but could cause disturbance through equipment operation or smoke from prescribed fire. Effects of these treatments to habitat would be assessed as short-term and long-term impacts. Stand Density Index (SDI) is used to measure the risk of a stand's susceptibility to insect and disease as a result of stand densification. From the initial density reduction treatment, effects from the reduction occur roughly over a 30 year period. After 30 years stands begin to put on basal area growth, height, and begin to recruit new trees into the stands, increasing SDI (personal communication Will Brendecke, District Silviculturist). To standardize the length of time when referencing short-term and long-term impacts to wildlife habitat from forest thinning, short-term impacts are $\leq$30 years and long-term impacts are those that would occur over $\geq$30years.

Bounding Spatial and Temporal Changes within the Zone of Influence

For this project proposal, activity area boundaries are considered to be the smallest identified area where the potential direct and indirect effects from different management practices could occur. The project area proposes treatments to ponderosa pine, mixed conifer, and lodgepole pine stands within the Matrix land allocation on the Sisters Ranger District. A watershed analysis was completed in 2013 to characterize the human, aquatic riparian, and terrestrial features, conditions, processes and interactions (ecosystem elements) within the watershed. The discussion of wildlife cumulative effects will be focused on the units proposed for treatments and their incremental impacts in combination with past, present and reasonably foreseeable projects primarily within the Deep Canyon Watershed ("zone of influence"). Only National Forest System lands will be analyzed within the "zone of influence".

Project effects to northern spotted owl Critical Habitat and spotted owl habitat connectivity are assessed at the landscape scale. The cumulative effects analysis will be assessed for the East Cascades North Critical Habitat Unit #7, ECN Subunit #8.

Initially, only the watersheds that overlapped the Melvin Butte project area in space were considered for cumulative effects (e.g. Deep Canyon) because these watersheds, combined, would encompass habitat and territory size for a number of wildlife species. However, in order to be consistent with the best available science and account for variation in habitat types and structural conditions for analyzing effects to dead wood (snags and logs), at least 12,800 acres of a habitat type are necessary (See Appendix XX). The overlapping Deep Canyon watershed does not contain this amount of lodgepole pine or eastside mixed conifer habitat; therefore a second watershed was added: the adjacent Whychus watershed. The Whychus watershed is very large, making up a large portion of the southern end of the Sisters Ranger District. Effects using this watershed would focus on the lodgepole pine and eastside mixed conifer habitat. These watersheds comprise the habitat types the action alternatives are treating at scales that would meaningfully represent any cumulative effects (e.g. species territory size, connectivity to habitat across the Forest, and account for variation). Only National Forest System lands will be analyzed within the "zone of influence"; private lands are not managed for snag and log habitat or Management Indicator Species. Habitat for each identified species associated with the project area would be discussed on a forest wide basis to address species viability as it relates to MIS.

Chapter 3 of the EA contains a list of past, present and reasonably foreseeable future projects within the Deep Canyon and Whychus watersheds that has the potential to contribute to cumulative effects. However, not all projects on the list impact wildlife or wildlife habitat. Therefore, Table 5 is a subset of the list from Chapter 3 of ongoing and reasonably foreseeable future actions identified as potentially contributing towards cumulative effects to wildlife in the watersheds. Habitat for each identified species associated with the project area will be discussed on a forest wide basis to address species viability as it relates to MIS.

Table 5: Ongoing or Reasonably foreseeable actions in the project area and Deep Canyon 10th field watershed

Type of Action	***General Description***	***Status/Timing***	***Acres***
Vegetation Management			
Pole Creek Fire Timber Salvage	*Salvage of fire killed timber*	*Ongoing*	*54 acres*
Pole Creek Fire Hazard Tree Removal	*Felling and Salvage of fire killed danger trees*	*Ongoing*	*350 acres*

Three Creeks Personal Use Firewood	*Personal use firewood cutting*	*Ongoing*	*3,029 acres*
Ursus BFR	*Thinning and mastication*	*Reasonably foreseeable*	*5,900 acres*
Bear Wallow Firewood BFR	*Fire wood cutting along the FS Road 4601*	*Ongoing*	*11 miles of road approximately 510 acres*
Bend Municipal Watershed Fuels Reduction BFR	*Hazardous fuels reduction; thinning*	*Reasonably foreseeable*	*12 miles of road approximately 400 acres*
Two Bulls Fire Salvage, BFR	*Salvage of fire killed timber*	*Ongoing*	*Approximately 250 acres.*

Northern Spotted Owl

The analysis conducted for the northern spotted owl includes a forest-wide analysis of all nesting, roosting, foraging (NRF) and dispersal habitat, Critical Habitat Units, known home ranges, and late-successional reserves. NRF acres used are derived from the 2014 Programmatic Biological Assessment (BA) update for the 2014 Deschutes and Ochoco Programmatic Biological Assessment and reflect the most current situation (USDA 2014). CHU refers to the area reflected in the 2013 update to the Critical Habitat Rule (USDI 2012). An analysis of each home range has also been conducted. A 1.2 mile radius circle is used as a home range distance in the Cascade Range. This equates to approximately 2,882 acres.

R6 Sensitive Species

Sensitive species from the R6 Regional Forester's Sensitive Species list (07/13/2015) were only analyzed if they have potential habitat in the project area. Some Sensitive Species are also Management Indicator Species (MIS) identified in the Deschutes National Forest Land and Resource Management plan and were analyzed for the Forest and the project area. Surveys have not been conducted for each species. In some cases, no surveys have occurred and in others, surveys may not have been conducted on a consistent basis. Incidental observations may also contribute to known sittings.

Key Issues/Analysis Issues and Comparison Measures

Key Issues identified from public scoping were used to develop Alternative 3. In addition, Analysis Issues identified from Forest Plan Standards and Guidelines (as Amended) or the latest science and guidance, were used to illustrate the effects to wildlife and how those effects differ by alternative. In this analysis, commercial thinning and fuels treatments are the major impacts to habitat quality, quantity and species life needs. Using the same units of measure allows the major impacts to be easily understood and compared, providing the Decision Maker the necessary information to make an informed decision.

Road Closures and Road Decommissioning Common to all Action Alternatives

Under Alternatives 2 and 3 the Melvin Butte project proposes to close approximately 6 miles of roads and decommission approximately 8 miles of roads. These actions are beneficial to all wildlife species analyzed in both the Biological Evaluation and MIS analysis. These actions reclaim habitat as well as remove motorized disturbance to individuals and reproductive habitat.

This analysis specifically addresses the effects of road closures and obliteration when road density objectives are directly associated with a specific standard or guideline, or there is habitat management direction from recent science and guidance that identifies specific habitat benefits associated with road density objectives. Finally, road closure and decommissioning are identified in specific species analysis when effects directly contribute to habitat restoration.

Executive Summary

Summary of Effects/Impacts for TES, MIS, SOC, (landbirds and NWFP/S&M)

The Biological Evaluation (BE) analyzes the effects to federally Threatened, Endangered, Proposed, and Candidate species, and impacts to Region 6 Sensitive Species associated with the Melvin Butte project on the Deschutes National Forest. Habitat occurs in the project area for two federally listed species, designated northern spotted owl Critical Habitat, and seven Sensitive Species. The following is a summary of the findings of this BE on the effects/impacts of the two action alternatives.

Alternatives 2 and 3 would have ***No effect*** to the federally endangered gray wolf and its habitat.

Alternatives 2 and 3 would have ***No effect*** to the proposed Threatened pacific fisher and its habitat.

Alternatives 2 and 3 would have ***No effect*** to the federally Threatened northern spotted owl and its habitat.

Alternatives 2 and 3 ***May affect but not likely to adversely effect*** northern spotted owl designated Critical Habitat.

Alternatives 2 and 3 would have ***No effect*** to the federally Threatened Oregon spotted frog and its habitat.

Alternatives 2 and 3 would have ***No effect*** to Oregon spotted frog proposed Critical Habitat.

Alternatives 2 and 3 would have ***No impact*** to the Townsend's big-eared bat, but ***May impact but will not lead to a trend towards federal listing*** for the fringed myotis, and pallid bat.

Alternatives 2 and 3 ***May impact but will not lead to a trend towards federal listing,*** for the western bumblebee and Johnson's hairstreak.

Alternatives 2 and 3 ***May impact but will not lead to a trend towards federal listing*** for the sensitive white-headed woodpecker and Lewis' woodpecker.

Alternatives 2 and 3 would have **No impact** for the following Sensitive Species due to a lack of habitat:, silver-bordered fritillary, Crater Lake tightcoil, evening fieldslug, Columbia spotted frog, wolverine, American peregrine falcon, bald eagle, greater sage grouse, bufflehead, northern waterthrush, harlequin duck, horned grebe, tricolored blackbird, yellow rail, and Tule greater white-fronted goose.

Federally Listed and Proposed Species

Habitat for the northern spotted owl occurs in the Melvin Butte project area. A Joint Aquatic and Terrestrial Biological Assessment for Federal Lands within the Deschutes and John Day River Basins Administered by the Forest Service was completed in 2014 (USDA Forest Service 2014) for projects

proposed on the Deschutes National Forest that may affect but would not likely adversely affect the northern spotted owl. The BA established project design criteria to streamline the consultation process with the U.S. Fish and Wildlife Service (FWS) for projects proposed from 2013 to 2016. The goal for the Forests is to fully implement the criteria to achieve conservation and recovery objectives of federally listed, proposed, and candidate species. Project design criteria are used as sideboards for the planning process and include effects from habitat alteration and noise disturbance. The federal listed Endangered gray wolf is also included in this analysis. Table 6 lists these species, their habitats, and potential effects.

Table 6: Federally listed and proposed species under the Endangered Species Act.

Federally Listed and Proposed Species under the Endangered Species Act				
Species	**Status**	**Habitat**	**Habitat/ Presence in Project Area**	**Effect**
Gray wolf (*Canis lupus*)	Federal Endangered	Any plant association group	No denning or rendezvous habitat; low potential for dispersal habitat	No Effect
Northern spotted owl (*Strix occidentalis caurina*)	Federal Threatened, MIS	Old growth mixed conifer forests	No Nesting, roosting, and foraging habitat (NRF) within project boundary	No Effect
Northern spotted owl (*Strix occidentalis caurina*) Critical Habitat	Federal Threatened, MIS	Old growth mixed conifer forests	Designated Critical Habitat within project boundary	May Effect NLAA
Oregon spotted frog (Rana pretiosa)	Federal Endangered	Shallow lakes, ponds	No habitat	No Effect
Oregon spotted frog (Rana pretiosa) proposed Critical Habitat	Federal Endangered	Shallow lakes, ponds	No habitat	No Effect

Gray wolf

Measure: Effects to denning habitat and rendezvous sites

Existing Condition

The gray wolf usually occurs in forested habitats with some open areas such as river valleys and meadows for hunting prey including pronghorn, deer and elk, and smaller mammals. Wolf packs

(usually 5-10 animals) can have very large territories—up to 400 square miles or larger. Key wolf habitat components identified in the 1987 Wolf Recovery Plan (USDI Fish and Wildlife Service 1987) include: "1) a sufficient, year-round prey base of ungulates and alternative prey, 2) suitable and somewhat secluded denning and rendezvous sites, and 3) sufficient space with minimal exposure to humans. Den sites are excavated areas in the soil but hollow logs, beaver lodges, the base of hollow trees, pit excavations, and rock caves, usually near water, are also used. Rendezvous sites are the activity sites used after the denning period and prior to the nomadic hunting period of fall and winter. They are often in open grassy areas near water or at forest edges."

There are no known denning habitat or known rendezvous sites on the Deschutes National Forest. There are no known wolf packs on the Deschutes National Forest. The closest known packs occur on the Umatilla National Forest in northeastern Oregon and on the Rogue River Siskiyou National Forest in southwest Oregon. The project area contains habitat for wolf prey species (deer and elk).

In Oregon, the gray wolf is listed as federally Endangered in areas west of Highways 395, 78, and 95 which includes the Deschutes National Forest. In 2011, a single male gray wolf was documented dispersing through the southern portion of the Deschutes National Forest and subsequently traveled south into California. In 2012, it was documented traveling back and forth across the California/Oregon southern border and has established a pack in southern Oregon on the Rogue Siskiyou National Forest. More recently (2014/2015), there have been several wolves documented moving through the Forest but none have taken up residency.

Alternative 1 (No Action)—Ecological Trends

Under the No Action Alternative vegetation management treatments would not occur within Melvin project area. However, the "ecological trend" in the short-term is that stands would continue to remain suppressed and at risk of a stand replacement wildfire. Development of future old growth within ponderosa pine and mixed conifer stands would be prolonged and the old trees within the stands would continue to be stressed, decreasing their longevity. However, stands would continue to provide habitat for ungulate populations that provide the main prey base for the gray wolf. In the long-term, in the absence of a stand replacement wildfire or insect outbreak, diseased stands would continue to die and the multi-storied stand structure would diminish along with any remnant old growth trees, providing a very discontinuous overstory and lack of suitable hiding cover across the project area for ungulates. However, stand replacement fires are beneficial to deer populations due to the increase in browse production resulting from the removal of the forest canopy. Other prey species would also decline due to lack of habitat in the short-term. Elk tend to avoid the stand replacement fire areas due to lack of shade in the hot summer months and grass for forage since these areas are dominated by early seral shrubs.

Direct and Indirect Effects—Alternatives 2 and 3

There are no known gray wolf packs associated with the Melvin Butte project area or the Deschutes National Forest; therefore there are no direct or indirect effects associated with the action alternatives.

The action alternatives provide some level of thinning and mowing and burning across the project area. Thinning would open up stands reducing crown closure, promoting the development of

herbaceous plants. Thinning treatments have the potential to improve the forage base of prey species of the wolf such as snowshoe hare, deer, and elk. Treatments would create a mosaic of forage and browse while retaining cover which is beneficial to all gray wolf prey species. There is No Effect to gray wolf or its habitat under Alternative 2 or Alternative 3.

Cumulative Effects— Alternatives 2 and 3

Alternatives 2 and 3 would have no cumulative effects to the gray wolf and their habitat.

Conclusion—Alternatives 2 and 3

In conclusion, because there are no denning or rendezvous sites or wolf packs on the Deschutes national Forest, there are no direct indirect, or cumulative effects to the gray wolf or its habitat under Alternatives 2 or 3. There would be ***No Effect*** to the gray wolf. There would be beneficial effects to prey habitat under the action alternatives.

Northern Spotted Owl, Federally Threatened, MIS

Measures:

(1) Effects to nesting, roosting, and foraging habitat
(2) Effects to dispersal/connectivity habitat
(3) Effects to critical habitat

Existing Condition

The project area occurs within the range of the northern spotted owl. Spotted owls are primarily inhabitants of old growth and mature forests. Suitable spotted owl habitat contains adequate quantities of dead and down woody material, decadent trees, a medium to high crown closure, multiple layers in the overstory, and trees at least 200 years old or greater than 32 inches dbh (USDA Forest Service and USDI Fish and Wildlife Service 1990). Functional nesting, roosting, and foraging (NRF) habitat for the spotted owl on the Deschutes National Forest includes stands of mixed conifer, ponderosa pine with white fir understories, and mountain hemlock with subalpine fir. The canopy cover is typically greater than or equal to 40% with an overstory comprised of at least five percent of trees greater than 21 inches diameter-at-breast- height (dbh). Habitat that meets NRF requirements also provides foraging habitat, although a wider array of forest types are used for foraging, including more open and fragmented habitat. (USDA 2014).

Suitable nest sites are generally in cavities in the boles of either dead or live trees. Platform nests may also be used (but more rarely), which include abandoned raptor nests, broken treetops, mistletoe brooms, and squirrel nests. Relatively heavy canopy habitat with a semi-open understory is essential for effective hunting and movement.

Habitat conditions that support good populations of northern flying squirrels (*Glaucomys sabrinus*), western red-backed voles (*Clethrionomys californicus*), and other nocturnal or crepuscular small mammals, birds, and insects are essential to supporting spotted owls. An analysis of local spotted owl

pellets showed the primary prey species on the Deschutes National Forest is the northern flying squirrel with red-backed vole, bushy-tailed woodrat (*Neotoma cinerea*), western pocket gopher (*Thomomys mazama*), Douglas squirrel (*Tamiasciurus hudsonicus*), snowshoe hare (*Lepus americanus*), voles (*Microtus spp.*), mice (*Peromyscus spp.*), and insects as secondary prey items.

Flying squirrels were once thought to be old-growth dependent but several studies have shown that densities were similar in both young and old forests, especially if old forest legacies (e.g. large decaying logs) and well-developed understories were present (Rosenberg and Anthony 1992, Carey 1995, Waters and Zabel 1995, Carey et al. 1997, Carey 2000, Carey et al. 2002, and Ransome and Sullivan 2003). Den sites have been documented in cavities in live and dead old growth trees, stick nests, moss nests, cavities in branches of fallen trees, decayed stumps, and suppressed young trees (Carey et al. 1997). Mychorrizal and epigeous fungi, in particular truffles, are an important food source for flying squirrels (Waters and Zabel 1995, Waters et al. 2000, Carey et al. 2002, and Lehmkuhl et al. 2006a) but where winter snow levels are deeper, as seen in eastside habitats more often, other foods become important such as lichens (Rosentreter et al. 1997, and Lehmkuhl et al. 2006a).

Carey et al. (1997) specifically studied dens of the northern flying squirrel. They found the majority of dens were in live trees. They recommend that management for northern flying squirrels include leaving large fallen trees, large diameter tall stumps, and large green trees with platform branching, multiple tops and/or cavities. While retaining snags in burned areas is important to provide options for the flying squirrel, retaining all snags is not. Developing closed canopy stands to provide habitat may be more important following a fire.

Legacy retention (snags and coarse woody debris) is important to prey species following a disturbance (Courtney et al. 2004). Legacy materials left on site increase the complexity of the environment of young stands by increasing horizontal and vertical structure, which provides for greater prey species diversity (Carey and Harrington 2001). Carey and Johnson (1995) suggest conservation of some coarse woody debris, woody plant species diversity, and understory promotion to enhance biodiversity for prey species. Carey (1995) recommends a range of snags from 2.8 to 8.1 snags per acre >21 inches dbh along with well-distributed patches of dense shrubs for high densities of flying squirrels. The legacy retention can accelerate habitat development for spotted owls and their prey.

Consultation History

Level 1 review was initiated on August 8, 2013 to discuss project effects to northern spotted owl designated Critical Habitat. Jennifer O'Reilly, U. S Fish and Wildlife Biologist, Lauri Turner, Deschutes National Forest Wildlife Biologist, and Monty Gregg ,Sisters Ranger District Wildlife Biologist participated in the discussion. A rationale for determination of effects to northern spotted owl primary constituent habitat elements in designated critical habitat was developed at that time. A Biological Assessment was submitted on February 24, 2015 and a Letter of Concurrence was issued by the U.S. Fish and Wildlife Service on March 5, 2015.

2011 Revised Recovery Plan for the Northern Spotted Owl

The Revised Recovery Plan for the Northern Spotted Owl (Recovery Plan) was approved on June 28, 2011 (USDI Fish and Wildlife Service 2011). The Recovery Plan states that many populations of spotted owls continue to decline, especially in the northern parts of the subspecies' range, even with extensive

maintenance and restoration of suitable habitat. Managing sufficient habitat for the spotted owl now and into the future is important for its recovery. However, it is becoming more evident that securing habitat alone will not recover the spotted owl. Based on the best available scientific information, competition from the barred owl (*Strix varia*) poses a significant and complex threat to the owl. Past and current habitat loss are also threats to the spotted owl, even though loss of habitat due to timber harvest has been greatly reduced on Federal lands over the past two decades (USDI Fish and Wildlife Service 2011).

The Recovery Plan recognizes the extremely complex nature of management of spotted owl habitat in dry forests. It recommends that the dynamic, disturbance-prone forests of the eastern Cascades, California Cascades and Klamath Province be actively managed to meet overlapping goals of spotted owl conservation, responds to climate change, and restores dry forest ecological structure, composition and processes, including wildfire and other disturbances (III-20). The intent of the Recovery Plan is " …to embed spotted owl conservation and recovery within broader dry forest ecosystem restoration efforts to increase the likelihood spotted owl habitat will remain on the landscape longer and develop as part of this fire adapted community instead of being consumed by uncharacteristic wildfires." (III-32). On page III-34 of the Recovery Plan, the FWS provides the following principles for dry forest restoration treatments:

- Emphasize vegetation management treatments outside of spotted owl core areas or high value habitat where consistent with overall landscape project goals;
- Design and implement restoration treatments at the landscape level;
- Retain and restore key structural components, including large and old trees, large snags and downed logs;
- Retain and restore heterogeneity within stands. (Fine scale mosaic);
- Retain and restore heterogeneity among stands. (Meso-scale mosaic); and
- Manage roads to address fire risk: use wildfires to meet vegetation management objectives where appropriate.

2013 Designated Critical Habitat

The final rule for Critical Habitat designation was released on December 4, 2012 and became effective on January 3, 2013 (USDI Fish and Wildlife Service 2012). The FWS encourages land managers to consider implementation of forest management practices recommended in the Revised Recovery Plan to restore natural ecological processes where they have been disrupted or suppressed and the application of "ecological forestry" management practices within critical habitat to reduce the potential for adverse impacts associated with commercial timber harvest when such harvest is planned within or adjacent to critical habitat. The FWS encourages land managers to consider the conservation of existing high quality northern spotted owl habitat, the restoration of forest ecosystem health, and the ecological forestry management practices recommended in the Revised Recovery Plan that are compatible with both the goals of spotted owl recovery and Standards and Guidelines of the Northwest Forest Plan. In fire-prone forests east of the Cascade crest, it is recognized that vegetation and fuels management may be appropriate both within and outside designated critical habitat where the goal of such treatment is to conserve natural ecological processes or restore processes such as fire where they have been modified or suppressed.

Critical Habitat is defined in section 3 of the Act as (50 CFR Part 17 p. 71896):

- The specific areas within the geographical area occupied by a species, at the time it is listed in accordance with the Act, on which are found those physical or biological features
- Essential to the conservation of the species and
- That may require special management considerations or protection and
- Specific areas outside the geographical area occupied by a species at the time it is listed, upon a determination that such areas are essential for the conservation of the species

Physical and Biological Features

Physical and biological features (PBFs) are essential to the conservation of the species and may require special management considerations or protection. Physical or biological elements of habitat include but are not limited to (50 CFR Part 17 p. 71897):

- Space for individual and population growth and for normal behavior
- Food, water, air, light, minerals, or other nutritional or physiological requirements
- Cover or shelter
- Sites for breeding, reproduction, and rearing (or development) of offspring
- Habitats that are protected from disturbance or are representative of the historic geographical and ecological distributions of a species

For the northern spotted owl, physical or biological features essential to the conservation of the species are forested areas that are used or likely to be used for nesting, roosting, foraging, and dispersing. The specific characteristics or components that comprise these features include, for example, specific ranges of forest stand density and tree size distribution, coarse wood debris, and specific resources, such as food, nest sites, cover, and other physiological requirements of spotted owls and considered essential to the conservation of the species.

Primary Constituent Elements

For the northern spotted owl, primary constituent elements (PCEs) are specific characteristics that make areas suitable for nesting, roosting, foraging, or dispersal habitat. To be essential to the conservation of the northern spotted owl, features need to be distributed in a spatial configuration that's conducive to persistence of populations, survival, and reproductive success of resident pairs and survival of dispersing individuals until they can recruit into a breeding population. There are four PCEs: (1) a forest type in early, mid, or late seral stages and that supports the owl across its geographical range; (2) habitat that provides for nesting and roosting; (3) foraging habitat; and (4) habitat to support the transience and colonization phases of dispersal. The PCE #1 (forest type) must be in concert with at least one other PCE to be critical habitat.

The Melvin Butte project area does not provide owl habitat because canopy closure and stand structure do not meet the definition of nesting, roosting, and foraging habitat (NRF). No NRF habitat is located in the project area. Existing stands do not provide adequate cover or shelter for the owl or their prey (flying squirrels) and sites for breeding, reproduction, and rearing (or development) of offspring. Due to the presence of insects and disease stand canopies are very fragmented and disjunct and do not provide canopy closure and contiguous overstory large tree structure needed for nesting, roosting, foraging

(prey habitat). The Melvin Butte project area does support the transience and colonization phases of dispersal but does provide the minimum stand requirements to provide the security needed for dispersing birds through the project area. The Melvin Butte project area provides the PCEs for dispersal habitat.

Critical Habitat on the Deschutes National Forest

Critical Habitat delineation on the Deschutes National Forest does not occur in a contiguous fashion but is instead mapped as two separate Critical Habitat units (CHUs) across the three ranger districts. The Deschutes National Forest lies primarily in CHU #7. In addition, there is a small portion of CHU #6, West Cascades South, on the southern end of the Deschutes National Forest on the Crescent Ranger District. Table 7 lists the acres in the CHUs and percentage of the CHUs that occur on the Deschutes National Forest. There are 250,056 acres of CHU #7 and 3,274 acres of the CHU #6 on the Deschutes National Forest.

Table 7. Acres of Critical Habitat units 6 and 7 on the Deschutes National Forest.

Critical Habitat Unit	Total Acres of Critical Habitat Unit	Total Acres of Critical Habitat Unit on Forest	Percent of Total CHU the Forest Occupies
Unit 7 – East Cascades North	1,345,523	250,056	18.5%
Unit 6 – West Cascades South	1,355,198	3,274	<1%
Total	2,700,721	253,321	19%

The critical habitat units are further divided into subunits. Three CHU subunits occur on the Deschutes National Forest: ECN 8, ECN 9, and WCS 5. Subunit ECN 8 is entirely on the Sisters Ranger District and Subunit WCS 5 is entirely on the Crescent Ranger District. Subunit ECN 9 lies on both the Bend-Fort Rock and Crescent Ranger Districts. It falls between the other two subunits on the Deschutes National Forest and therefore is important in providing north/south connectivity of habitat along the eastern range of the species. Connectivity within and between critical habitat subunits is necessary to provide demographic support and genetic diversity should fire, insects, disease, wind storms, and/or inclement weather significantly reduce the population in any individual subunit. Table 8 lists the number of acres in the Critical Habitat subunits on the Deschutes National Forest.

Table 8. Critical Habitat subunits on the Deschutes National Forest. The ECN 8 subunit occurs wholly on the Sisters Ranger District.

Critical Habitat Unit (CHU) Name	CHU Number	CHU Subunit	Total CHU Acres	Total CHU Acres on Forest lands	Total CHU Acres on Private lands	Total CHU Acres on Forest lands	Percent of CHU on Forest lands
East Cascades North	**07**	**ECN 8**	**94,622**	**94,517**	**106**	**94,622**	**100%**
East Cascades North	07	ECN 9	155,434	155,405	30	155,434	100%
West Cascades South	06	WCS 5	356,415	3,274	0	3,274	<.92%
		Total	606,471	253,196	136	253,330	

Status of the Spotted Owl Including Barred Owl Detections in Subunit ECN 8

Subunit ECN 8 consists of approximately 94,622 acres in Jefferson and Deschutes counties of federal lands managed by the Forest Service under the NWFP. Of the 94,622 acres, approximately 94,517 acres occur on the Deschutes National Forest while the remaining 106 acres occur on private lands.

Special management considerations or protection are required in this subunit to address threats from current and past timber harvest, losses due to wildfire and the effects on vegetation from fire exclusion, and competition with barred owls. This subunit is expected to function primarily for demographic support to the overall population, as well as north-south connectivity between subunits. It was determined that all of the unoccupied and likely occupied areas in this subunit are essential for the conservation of the species to meet the recovery criterion that calls for the continued maintenance and recruitment of northern spotted owl habitat. The increase and enhancement of northern spotted owl habitat is necessary to provide for viable populations of spotted owls over the long term by providing for population growth, successful dispersal, and buffering from competition with the barred owl.

This subunit is divided into four areas: Green Ridge, Meadow Lakes, Bluegrass Butte, and Trout. The Green Ridge area lies at the north end of the forest on the Sisters Ranger District and runs north-south along Green Ridge, wrapping around Black Butte and Suttle Lake running north to Brush Creek. It is bounded on the west by the Mt. Jefferson Wilderness and on the north by the Warm Springs Reservation. This area excludes the Metolius Basin and overlaps portions of the Metolius and Cache Late Successional Reserves (LSR). The Meadow Lakes area is small and is centered around Link and Meadow Lakes on the Sisters Ranger District and does not overlap any LSR. Bluegrass Butte is a small area bounded on the west by both the Mt. Washington and Three Sisters Wilderness areas. Highway 242 runs through the center and the Belknap Crater lava flow is excluded. It overlaps a portion of the Cache and Trout LSRs. The Trout area is bounded on the west by the Three Sisters wilderness and on the east by the NWFP line. It overlaps a portion of the Trout LSR.

Approximately 15% of the subunit is classified as NRF habitat (13,964 acres) and NRF is generally distributed throughout with the majority of habitat in the eastern half of the Green Ridge and Bluegrass Butte areas. The majority of the remaining habitat is considered dispersal habitat with the exception of the stand- replacement and mixed mortality fire areas. The major plant associations are white fir with moderate amounts of Douglas-fir, mountain hemlock, Pacific silver fir, and ponderosa pine (Table 9).

Table 9. Plant Association Group acres within Critical Habitat Subunit ECN 8 on the Deschutes National Forest.

PAG	Acres in PAG	% of PAG
Douglas Fir	11,643	12%
Grand Fir	120	<1%
Lodgepole Pine	0	0%
Mountain Hemlock	5,872	6%
Pacific Silver Fir	1,808	2%
Parkland	190	<1%
Pinyon-Juniper	92	<1%
Ponderosa Pine	2,425	3%
Subalpine Fir	66	<1%
Western Hemlock	283	<1%

White Fir	72,124	76%
Grand Total	**94,622**	**99%**

Approximately three-quarters (76%) of this subunit is comprised of the white fir PAG that has the potential to provide suitable spotted owl habitat in the appropriate plant associations. The mountain hemlock PAG does not have the complex structure needed to provide suitable spotted owl habitat and the ponderosa pine PAG is usually too dry and open to produce suitable habitat. However, due to fire suppression, understories contribute to short-term marginal NRF habitat and dispersal habitat in some locations. This occurs across the subunit where large trees can be grown but due to the overstocked nature of the stands areas are at high risk of loss from insects, disease, and/or wildfire that has occurred frequently on the Sisters Ranger District over the last 20 years.

Several wildfires have occurred partially or wholly in the ECN 8 since 2002: Cache Mtn. (2002), Eyerly (2002), RNA (2002), Link (2003), B&B (2003), Black Crater (2006), Lake George (2006), GW (2007), Summit Springs (2008), Wizard (2008), Black Butte II (2009), Shadow Lake (2011), Pole Creek (2012), Green Ridge (2013), and Bridge 99 (2014). Over 38,800 acres (41%) of this subunit have been impacted by fire (Table 10).

Table 10. Vegetation mortality due to wildfire in ECN 8 on the Deschutes National Forest.

Acres of Low Mortality	Acres of Mixed Mortality	Acres of Stand Replacement	Total Acres
17,874	10,927	10,064	38,865

Mixed mortality and stand replacement burns generally result in the loss of NRF habitat and potential dispersal habitat if the majority of stands are comprised of true firs, such as white fir. Low mortality areas are generally underburned and dispersal habitat is likely to be retained in these areas. In addition, significant insect and disease outbreaks have occurred within this subunit, most of which has been impacted by wildfire. A mountain pine beetle epidemic has impacted lodgepole pine stands in and adjacent to the Trout Creek area. As a result, approximately 90% of the lodgepole pine has been killed. This has led to the degradation of mixed conifer stands; primarily a reduction in canopy cover due to the loss of lodgepole pine. These white fir stands also contain significant levels of dwarf mistletoe which has resulted in canopy closure reductions as well and has left the area fragmented.

This subunit is expected to function primarily for demographic support to the overall population, as well as north-south connectivity between subunits. Connectivity exists from Green Ridge to Black Butte and occurs across Metolius Basin through ponderosa pine stands but becomes limited along the eastern slope of the Cascades as a result of wildfire. Impacts from large wildfires can be seen from the base of Mt. Jefferson south along the east slope of the Cascades to Three Creek Lake. The majority of these fires ranged from high elevation wilderness through the mid-slope regions where the majority of historic spotted owl home ranges were found. In addition, mortality has occurred within the high elevation lodgepole pine stands within the wilderness from the mountain pine beetle. Impacts from this outbreak occur from roughly Trout Creek Butte area south to Cultus Mountain on the Bend-Ft. Rock Ranger District. Impacts from fire and insects have limited north-south connectivity on the Sisters Ranger District primarily. Dispersal habitat occurs in the lower elevations primarily in overstocked ponderosa pine stands which are also at risk of loss. This subunit is still providing demographic support but at a

reduced level due to impacts from past wildfires. In stand replacement and mixed mortality areas it may take >300 years to produce suitable NRF habitat and >100 years to produce dispersal habitat due to the lack of a seed source for desired tree species (USDA Forest Service 2004a). In underburned areas, habitat is likely to be produced in 25-50 years and NRF in approximately 100 years due to the remaining residual trees.

Eight known spotted owl home ranges are found partially or wholly in ECN 8 subunit and all are considered viable. The Castle Rocks, Trout Creek, Davis Creek, and Bluegrass Butte home ranges have not been surveyed in the past 2 to 3 years and the site status is unknown. One additional pair, Black Crater, has been surveyed over the past two years but no birds have been detected.

In 2011, a new pair (Metolius Basin) was detected. This pair has not been found to be reproductive. In 2013, a new pair was detected (Meadow Creek). The reproductive status of this pair has not yet been determined.

Eight barred owl detections have occurred in this subunit since 1999. Two barred owl pairs have been documented with one pair found on the north end of Green Ridge near the Metolius Basin spotted owl pair and the other barred owl pair is associated with the north side of Black Butte (near the Obsidian spotted owl home range). A single barred owl was detected near Six Creek in 2012. Barred owls have not been detected Deep Canyon watershed associated with the Melvin Butte project area.

Subunit ECN 8 also overlaps four NWFP allocations – Late Successional Reserve (LSR), Matrix, Congressionally Reserved, and Administratively Withdrawn. Late-Successional Reserves have the objective to protect and enhance conditions of late-successional and old growth ecosystems, which serve as habitat for late-successional and old growth forest related species including the spotted owl. Administratively Withdrawn lands include recreation and visual areas, back country and other areas where management emphasis precludes scheduled timber harvest. Matrix is the area where most timber harvest and other silvicultural activities will be conducted. There is no LSR land allocation located in the project area.

Table 11 lists the mapped critical habitat acres at different spatial scales. There are 253,196 acres of critical habitat on the Deschutes National Forest and 94,517 acres of Subunit ECN 8. Within the Melvin Butte project area, there are approximately 3,731 acres of critical habitat mapped in the ECN 8 subunit. Approximately 2,971 acres of Melvin Butte vegetation management units occur in Critical Habitat.

Table 11. Mapped critical habitat that overlaps with the Melvin Butte project area.

	Acres of mapped critical habitat on the Deschutes National Forest	Percent (%) of Acres
CHU 7 on the Deschutes National Forest	253,196	100%
Subunit ECN 8 on the Deschutes National Forest	94,517	37% of CHU
Melvin Butte Project Area Boundary	3,731	4% of subunit ECN 8
Melvin Butte Vegetation Management units	2,971 acres	3% of subunit ECN 8
		1% of CHU on Forest

Table 12: Nesting, roosting, and foraging habitat in Critical Habitat and the Melvin Butte Project area.

Scale	Acres of NRF Habitat
Deschutes National Forest	70,108
Critical Habitat Subunit ECN 8	13,964
Melvin Butte Project Area Boundary	0
Melvin Butte Vegetation Management Units	0
Percentage of NRF Habitat Affected by Melvin Butte Project	0%

Dispersal Habitat and Connectivity

Northern spotted owls regularly disperse through highly fragmented forested landscapes. Corridors of forest through fragmented landscapes serve primarily to support relatively rapid movement through such areas, rather than colonization or residency of nonbreeding owls. During the transience or movement phase, dispersers use mature and old-growth forest slightly more than its availability; during the colonization phase, mature and old-growth forest is used at nearly twice its availability. Closed-sapling sawtimber habitat is used roughly in proportion to availability in both phases and may represent the minimum condition for movement. Spotted owls can also disperse successfully through forests with less complex structure, but risk of starvation and predation likely increase with increasing divergence from the characteristics of suitable habitat. The suitability of habitat to contribute to the successful dispersal of spotted owls is likely related to the degree to which it ameliorates heat stress, provides abundant and accessible prey, limits predation risk, and resembles habitat in natal territories. Dispersal habitat is essential to maintaining stable populations by promoting rapid filling of territorial vacancies when resident spotted owls die or leave their territories, and to providing adequate gene flow across the range of the species. Generally, dispersal habitat across the Deschutes National Forest is fragmented by roads, timber harvest units, or by areas that have been burned or defoliated by insects or disease but is found from the low ponderosa pine areas to the mountain hemlock zone in varying degrees of quality.

Dispersal habitat was defined by the Interagency Scientific Committee (USDA Forest Service and USDI Fish and Wildlife Service 1990) as stands with an average dbh of 11 inches and a 40% canopy cover. Those conditions are not biologically possible in all eastside plant association groups. In 1996, the Forest conveyed a Science Team of experts on local conditions to determine plausible definitions of dispersal habitat. The team developed a process by which local biological knowledge of sites would be used to describe dispersal habitat (USDA Forest Service 1996). Table 13 lists the criteria used to define dispersal habitat on the Deschutes National Forest.

Table 13. Dispersal habitat definitions.

Plant Association Group	Stand Criteria Average dbh, Percent Canopy Cover (CC)
Mixed Conifer Wet	11” dbh, 40% CC
Mixed Conifer Dry	11” dbh, 30% CC
Ponderosa Pine	11” dbh, 30% CC
Lodgepole Pine	7” dbh, 30% CC

Mountain Hemlock	7” dbh, 30% CC

Based on the criteria identified in the previous table, an analysis was completed and dispersal habitat was mapped for the entire Deschutes National Forest. Table 14 lists the acres of dispersal habitat at different spatial scales. Of the 289, 552 acres of dispersal habitat on the Deschutes National Forest, approximately 24,342 acres of dispersal habitat occur in Subunit ECN 8. The Melvin Butte Project area lies in the southern portion of ECN 8 on the eastern edge of the northern spotted owl’s range. Approximately, 2,796 acres of dispersal habitat exists across the Melvin Butte project area.

Table 14: Dispersal habitat in critical habitat and the Melvin Butte Project area.

Scale	**Acres of Dispersal Habitat**
Deschutes National Forest	289,552
Critical Habitat Subunit ECN 8	24,342
Melvin Butte Project Area Boundary	2,796

Connectivity in ECN 8 is highly fragmented due to the amount of fires and past timber harvest that has occurred across the Sisters Ranger District. ECN 8 was delineated in 2011 and Critical Habitat was officially designated in 2013. Although ECN 8 is associated with many fires, during the delineation, areas with the highest fire severity were avoided. Since 2011, the Green Ridge, Pole Creek, and Bridge 99 fires have continued to impact and fragment ECN 8.

The 2012 Pole Creek fire is directly adjacent to the Melvin Butte project and has been the largest fire on the District since 2011. The Pole Creek fire burned approximately 26,795 acres and heavily fragmented the southern portion of ECN 8.

As part of the overall project design for dispersal habitat and to meet the intent of the purpose and need of the project, a retention strategy was developed for spotted owl dispersal habitat. The primary objective of the retention strategy is to provide connectivity for spotted owls in a north to south continuum throughout the project area by retaining dispersal habitat. The retention strategy is based on the inherent soil quality and stand productivity, where the project retains more untreated stands in areas that have high site productivity and contain the most contiguous acres of dispersal habitat. By using the Land Type Association (LTA) mapping that was previously described, the project was broken into 3 major soil types which are classified as low, moderate, and high site productivity. Due to the high canopy closure and high tree density that must occur in stands to provide dispersal habitat, stand viability is greatly reduced in areas where site productivity is low to moderate. In areas where site productivity is moderate to high, stand viability may be maintained for a longer duration.

The retention strategy identified a range of retention levels for dispersal habitat across the project area. Within stands containing low site productivity, dispersal habitat/untreated stands would be retained at a 10% level; in the areas with moderate site productivity dispersal habitat/untreated stands would be retained at 15% level; and in areas that have the highest site productivity dispersal habitat/untreated stands would be retained at the 20% level. Retention would occur on a stand by stand basis to retain areas that contain the highest densities of contiguous dispersal habitat. Therefore no untreated areas would occur within implementation units. Approximately 1,317 acres of the project area have been

identified as low site productivity, therefore 10% or 131 acres would be retained in areas that provide dispersal habitat for the spotted owl. Approximately 1,451 acres of the project area have been identified as moderate site productivity, therefore 15% or 217 acres would be retained in areas that provide dispersal habitat for the spotted owl. Approximately 1,832 acres of the project area have been identified as high site productivity, therefore 20% or 366 acres would be retained in areas that provide dispersal habitat for the spotted owl. Table 14 provides a summary of retention objectives by site potential. These areas would provide residual overstory diversity and structure to allow for dispersal through the project area.

Table 14. Retention Strategy by Site Productivity for the Melvin Butte Project Area.

Site Productivity	Retention Levels	Acres of Melvin Butte Project Area in Low, Medium, and High Site Productivity	Total Acres Identified to Minimally Retain as Dispersal Habitat
Low	10 percent	1,317 acres	131 acres
Medium	15 percent	1,451 acres	217 acres
High	20 percent	1,832 acres	366 acres
	Total	4,600 acres	714 acre

To meet the objective identified in Table 14 (above), stands were reviewed and those stands containing the highest densities of contiguous dispersal habitat were identified and retained as no treatment areas. Table 15 displays the actual acres identified for dispersal stands based on site productivity.

Table 15. Retention Strategy by Site Productivity for the Melvin Butte Project Area.

Site Productivity	Retention Levels	Acres of Melvin Butte Project Area in Low, Medium, and High Site Productivity	Actual Acres Retained for Dispersal Habitat
Low	10 percent	1,317 acres	158 acres
Medium	15 percent	1,451 acres	230 acres
High	20 percent	1,832 acres	364 acres
	Total	4,600 acres	752 acres

In addition, the connectivity strategy was built around other stands that would not be treated for other resource issues which also contain dispersal habitat. These areas include the Three Creeks Riparian Reserve and some areas of steep slopes that are excluded from treatment which total approximately 162 acres.

Of the 2,796 acres of dispersal habitat identified within project area, 914 acres or 32% of the area would be retained to provide connectivity for dispersing birds in a north south continuum throughout the project area.

Alternative 1 (No Action)—Ecological Trends

Under the No Action Alternative no treatments would occur within Melvin Butte project area. However, the “ecological trend” in the short-term is that stands would continue to remain suppressed and at risk of insects, disease and a stand replacement wildfire. Development of future old growth within ponderosa pine and mixed conifer stands would be prolonged and the old trees within these stands

would continue to be stressed, decreasing their longevity. However, stands would continue to provide dispersal habitat in the short-term. In the long-term, in the absence of a stand replacement wildfire or insect outbreak, the stands containing disease would continue to die and the multi-storied structure would diminish along with any remnant old growth trees. As a result, dispersal habitat for the northern spotted owl would continue to diminish as the overstory canopy becomes more open making the species more susceptible to predation. Due to stand densities within the project area and increases in mortality, the risk of large scale disturbance event in the project area increases over time, potentially impacting spotted owl dispersal habitat.

Stand resilience to insects and disease is measured by the Upper Management Zone (UMZ). The UMZ relates to the density of trees (basal area, trees per acre, etc.) a forest stand can support without significant mortality from bark beetles. The upper management zone is the density level at which trees begin to come under significant stress and can become susceptible to bark beetles and other insects and diseases. Forest stands managed below the upper management zone are more resilient. There are approximately 4,456 acres that have the potential to receive vegetation treatment. Under the existing condition, 92% of these stands are above the Upper Management Zone and are at risk or may currently be impacted by insects and disease due to high stand densities, resulting in low stand resiliency.

Direct and Indirect Impacts—Alternatives 2 and 3

The Revised Recovery Plan emphasizes the conservation of spotted owl sites and high value spotted owl habitat (page I-2). Interim Guidance recommends that site conservation priorities for reproductive status are (page III-44):

- Known sites with reproductive pairs;
- Known sites with pairs;
- Known sites with resident singles; and
- Historic sites with reproductive pairs, pairs, and resident singles, respectively.

Further recommendations include avoiding activities that would reduce nesting, roosting, and foraging habitat within provincial home ranges (1.2 mile radius) of reproductive pairs (III-45). The project meets the interim guidance and recommendations.

There are no known sites or historic sites within the project area, therefore disruptive work activities would not take place within ¼ mile (1.0 miles for blasting, ½ mile for helicopter) of nest sites or home ranges.

The project area does not contain any suitable NRF habitat, therefore no thinning or prescribed burning would occur within suitable NRF habitat. There would be no modification of any NRF habitat in Critical Habitat ECN 8 subunit.

Treatment types for Alternatives 2 and 3 in dispersal habitat include thinning from below (HTH), mixed conifer thinning from below with group opening (MCGO), mixed conifer thinning from below without group openings (MC without openings), non-commercial thinning (P), Burn Only (B), lodgepole improvement (LPI), and dwarf mistletoe restoration (DM). Table 16 summarizes the acres associated with each treatment type.

Table 16. Treatment Type and Acres for Alternative 2 and 3.

Treatment Type	Alternative 2	Alternative 3
HTH	998 acres	1,164
MCGO	839 acres	0
MC without openings	0	769
P	1,174	1,174
B	809	809
LPI	249	249
DM	160	0
Total Acres.	**4,469**	**4,405**

Under Alternatives 2 and 3 of the approximately 2,796 acres of available dispersal habitat, about 1,882 acres would be treated. The majority of the dispersal habitat occurs primarily within units associated with thinning from below (HTH), mixed conifer thinning from below (MCGO and MC without openings), and Prescribed Burning. Some of the second growth ponderosa pine non-commercial thinning units (P), where trees are approximately 40+ years old, minimally meet the requirement for dispersal habitat and therefore dispersal is not typically contiguous in these units.

Very little to no dispersal habitat exists in the Dwarf Mistletoe Treatment units. The dwarf mistletoe units are associated with past ponderosa pine shelterwood harvest, containing a sparse overstory of individual large trees with a dense understory of regeneration approximately 20 to 40 years old. These stands are very open and overstory canopy is discontinuous and does not provide dispersal habitat.

Very little to no dispersal habitat exists within the Lodgepole Pine Improvement Treatment units. A mountain pine beetle outbreak impacted this area approximately 15 years ago and as a result stands are very fragmented and discontinuous.

The objective each type of thinning is to reduce stand densities by thinning from below to 1) increase stand resiliency to insects and disease, 2) reduce fuel loading as well as ladder fuels minimizing the risk of stand replacing fire and 3) promote the development of fire tolerant late and old structure stands.

Due to impacts to the majority of NRF and dispersal habitat from stand replacement fire across the Ranger District, thinning treatments were designed to maintain and promote overstory ponderosa pine. Ponderosa pine is the key building block of large tree structure that provides the basis for NRF and dispersal habitat. These trees take the longest to develop and recruit into the overstory. Due to overstocked stands fire intensity has been such that these once fire resilient trees succumb to crown fire and many old growth ponderosa pine stands, as well as residual old growth legacy trees, have been lost to stand replacement fire. Thinning from below (HTH) is designed to thin stands in a mosaic fashion retaining heterogeneity in dry mixed conifer and promoting heterogeneity in second growth ponderosa pine stands. Although HTH units would reduce stand densities to a level that canopy cover does not meet minimum requirements for dispersal habitat, treatments would maintain fully stocked stands and contiguous overstory crowns.

Mixed conifer thinning (both MCGO and MC without openings) would also thin stands from below. This treatment focuses on maintaining overstory ponderosa pine by removing white-fir and lodgepole pine that contain insects and disease. Treatments focus on removing ladder fuels in the understory of overstory ponderosa pine. To maintain a contiguous overstory stand larger overstory white-fir not directly competing with overstory ponderosa pine would be retained. However, to build stand resiliency, within mixed conifer treatments associated with group openings, where stands do not contain

ponderosa pine, 1-3 acre group openings would be created and reforested with ponderosa pine. This would occur within 30% of this treatment type or on approximately 268 acres, reducing some overstory continuity.

Prescribed Burning Treatments (B) are designed for maintain late and old structure ponderosa pine stands. This treatment is not expected to reduce canopy cover but would reduce understory shrub densities, as well as sapling size conifer regeneration.

Treatments were designed to minimize the continued fragmentation of spotted owl dispersal habitat on the landscape in the long-term, and in the short-term to provide connectivity through the project area. The largest blocks of contiguous dispersal habitat were retained throughout the project area. Treatments were designed around blocks of habitat to facilitate movement of owls through the project area.

Because there are no known or historic sites within the project area and the project area does not contain any suitable NRF habitat, the project would have ***No Effect*** to the northern spotted owl.

Physical and Biological Features/ Primary Constituent Elements of Critical Habitat

East Cascades Special Management Considerations/Protection

Special management considerations or protection may be required in the East Cascades to address the effects of past activities associated with Euro-American settlement, such as timber harvest, livestock grazing, fire suppression, and fire exclusion, that have substantially altered the Inland Northwest, modifying the patterns of vegetation and fuels and subsequent disturbance regimes to the degree that contemporary landscapes no longer function as they did historically. This has affected not only the existing forest and disturbance regimes, but the quality, amount, and distribution of spotted owl habitat on the landscape. In order to preserve the essential physical or biological features, dynamic, disturbance-prone forests should be managed in a way that promotes spotted owl conservation, responds to climate change, and restores dry forest ecological structure, composition, and processes including wildfire and other disturbances. The following restoration principles were considered during project design:

1. Conserve older stands that contain the conditions to support spotted owl occupancy or high value owl habitat
2. Emphasize vegetation management treatments outside spotted owl territories or highly suitable habitat
3. Design and implement restoration treatments at the landscape level
4. Retain and restore key structural components, including large and old trees, large snags, and downed logs
5. Retain and restore heterogeneity within stands
6. Retain and restore heterogeneity among stands
7. Manage roads to address fire risk
8. Consider vegetation management objectives when managing wildfires where appropriate

Approximately 3,731 acres of CHU Subunit ECN8 occur within the project area. Overall, the project encompasses approximately 4% of the total ECN 8 acres. Approximately, 2,343 acres of dispersal habitat occurs within the CHU area associated with the Melvin Butte project. Approximately 742 acres

or 31% of dispersal/connectivity stands within the CHU associated with the Melvin project would be retained in untreated stands. No NRF habitat exists within the CHU. Table 17 provides a summary of effects to dispersal habitat in CHU ECN 8 overlapping the Melvin Butte project area. Table 18 provides a summary of dispersal habitat in the entire Melvin Butte project area.

Table 17. Summary of Effects to Dispersal Habitat in CHU ECN 8 overlapping the Melvin Butte Project Area.

Acres of CHU occurring Melvin Butte Project Area	% of Melvin Butte Project Area associated with total CHU Subunit ECN8	Acres of Dispersal Habitat within CHU in Melvin Butte Project Area	Acres of Dispersal Habitat retained within CHU in Melvin Butte Project Area Post Treatment	Acres of Dispersal Habitat reduced within CHU in Melvin Butte Project Area	% Dispersal Habitat within CHU in Melvin Butte Project Area Post Treatment
3,731 acres	4%	2,343 acres	742 acres	1,601 acres	31%

Table 18. Summary of Effects to Dispersal Habitat within the entire Melvin Butte Project Area.

Overall acres of Dispersal Habitat within Melvin Butte Project Area	Overall acres of Dispersal Habitat retained within total Melvin Butte Project Area Post Treatment	Overall acres of Dispersal Habitat reduced within total Melvin Butte Project Area	% Dispersal Habitat retained with the Melvin Butte Project Area Post Treatment
2,796 acres	914 acres	1,882 acres	33%

Treatments within critical habitat in the Melvin Butte project area were designed with the intent of following the East Cascade Special Management Considerations. All thinning from below (HTH), mixed conifer with and without group openings (MCGO), and prescribed burning (B) treatments were designed to meet all eight management considerations: **1) Conserve older stands that contain the conditions to support spotted owl occupancy or high value owl habitat**-There are no stands within the project area that support owl occupancy; site productivity within the project area is such that with fire exclusion, no highly suitable or high value habitat has developed over the last 100 years. The site productivity of the project area is low and will not support stand densities and condition associated with spotted owl occupancy or high quality habitat. The only habitat that exists is dispersal and untreated areas containing older stand characteristic will be retained to provide adequate dispersal for the spotted owl through the project area. **2) Emphasize vegetation management treatments outside spotted owl territories or highly suitable habitat -** No owl territories occur within or adjacent to the project area. The nearest viable owl territory is approximately 4 air miles and has not been occupied since 1994. **3) Design and implement restoration treatments at the landscape level -** The Melvin Butte project is part of Deschutes Collaborative Landscape Restoration (CFLR) process. This CFLR area covers approximately 208,028 acres of national Forest System lands and is associated with 5 other project areas covering 57,500 acres of NWFP lands including Melvin Butte. These projects are associated with spotted owl habitat. The Melvin Butte project connectivity strategy was developed to provide connectivity within the CFLRA. In the short-term (<30 years), the project will reduce the overall level of dispersal habitat. Although it will not create any movement barriers, it will not provide the needed levels of canopy cover

to provide security for dispersing birds. In the long-term (30+ years), treatments will promote the development of more fire tolerant dispersal habitat developing contiguous stands of late and old structure habitat dominated by overstory ponderosa pine increasing resiliency. **4) Retain and restore key structural components, including large and old trees, large snags, and downed logs -** Thinning prescriptions retain late and old structure habitat where it exists including snags and down logs. **5) Retain and restore heterogeneity within the stands -** Mosaic thinning will occur within black bark ponderosa pine to promote heterogeneity and the development of late and old structure. **6) Retain and restore heterogeneity among stands** - Thinning from below in multi-story mixed conifer stands will retain stand heterogeneity by maintaining all the components of the residual age classes and fully stock stands post thinning; stands containing the largest contiguous blocks of dispersal habitat would be retained between treatment units to retain heterogeneity between stands **7) Manage roads to address fire risk -** To reduce risk of fire starts associated with public use approximately 8 miles of road is proposed to be closed under the proposed action reducing road densities in the project area from 5.98 miles/sq. mile to 4.66 miles/sq. mile. **8) Consider vegetation management objectives when managing wildfires where appropriate -** Due to fire severity across the Sisters Ranger District, wildfire use is not used for management except site specifically in the Wilderness.

The portion of ECN 8 associated with the Melvin Butte project is an important element of the subunit. This area provides a very narrow band of connectivity between unsuitable habitat associated with the highly fragmented Pole Creek fire northwest of the project area and private timber land directly adjacent and east of the project to the next largest block of suitable dispersal habitat directly south of the project area. This provides a narrow movement corridor between ECN 8 and ECN 9.

Overall, treatments would reduce dispersal habitat in the short-term (<30 years) reducing the overall dispersal habitat within Critical Habitat in the Melvin Project area while retaining approximately 31%. Treatments would not cause barriers to movement but would reduce canopy cover by approximately 50%. In the long-term (30+ years), treatments would promote the development of understory ponderosa pine creating a contiguous stand of fire resistant dispersal habitat within the project area.

In the short-term, the project would reduce the overall amount of dispersal habitat by 3% in the ECN-8 subunit.

Alternatives 2 and 3 ***may affect but are not likely to adversely effect*** designated Critical Habitat.

Cumulative Effects—Alternatives 2 and 3

The cumulative effects area for the action alternatives are the Whychus and Deep Canyon watersheds as they both overlap ECN 8. Both watersheds were utilized to best display the historic spotted owl occupancy on the landscape. The western half of both watersheds occurs within the range of the northern spotted owl. Approximately 122 acres of NRF habitat occurs in the eastern area of the Deep Canyon watershed, though there are no known spotted owl homes ranges or home ranges or detections in the Deep Canyon watershed. None of the proposed actions in the watersheds are anticipated to have an effect on spotted owl NRF habitat.

No home ranges occur in the Deep Canyon watershed. Table 19 lists the habitat conditions for each historic home range that occurs in the adjacent Whychus watershed. The Black Crater and Bluegrass Butte home ranges are considered viable.

Table 19. Spotted owl home ranges

Spotted Owl Home Range	Viability and Status	NRF Acres within 1.2 Mile Home Range	Existing Percent (%) NRF acres within 1.2 Mile Home Range	NRF Acres in ECN 8 within 1.2 Mile Home Range	Last year of Activity
Deep Canyon Watershed					
No home ranges occur in this watershed					
Whychus Watershed					
Snow Creek	Non-viable	37	1%	0	2010
Trout Creek	Potentially viable but inactive	553	19%	2,611	1993
Black Crater	Potentially viable but inactive	807	28%	1,197	2007
Bluegrass Butte	Potentially viable but inactive	249	9%	2,510	2007

Fires have had the greatest influence on spotted owl habitat across the Sisters Ranger District by causing reduction of canopy cover, loss of multi-storied stands, and mortality of understory white-fir and to a lesser degree the loss of large Douglas-fir and ponderosa pine prior to the fires. These open stands are unsuitable nesting habitat for spotted owls. Insect and disease outbreak in the Whychus and Deep Canyon watersheds along with the Pole Creek Fire have produced ample down wood to meet forest standards and guidelines for down wood in the LSR and Matrix land allocations. The watershed has experienced moderate to heavy mortality with the insect outbreak of the early 1990s.

The influx of snags would increase the amount of down wood in the next 20 years. In the mixed severity areas, trees that survived the Pole Creek Fire would be able to provide a more consistent supply of dead wood material. Within stand replacement fire areas much of the pre-existing downed wood was consumed. However, within the fire perimeter a percentage of the existing down woody material are trees that have fallen since the fire and most are hard logs in Decay Classes 1 and 2 (Thomas 1979, Brown 1985). Some downed material was consumed within the mixed mortality and underburned areas as well, especially where fire intensity was greater. This primarily consisted of smaller material (<12 inches dbh) and advanced decayed logs. Larger pre-existing material is still present although logs are now case-hardened in many situations, making them less suitable for prey species.

The last 100 years of fire suppression has changed stand composition across the Sisters Ranger District. Stand densities have increased as well as outbreaks of insects and disease, although both are endemic to the district. As a result of disturbance large tracks of mortality exist in stands across the district. Since 2002, no major fires have occurred within the Deep Canyon watershed until the 2012 Pole Creek fire where approximately 4,081 acres burned and the Two Bulls fire burned approximately 487 acres, totaling approximately 4,568 acres. Table 20 provides a summary of recent fire history in the Deep Canyon and Whychus watersheds since 2002.

Table 20. Recent Fire History in the Deep Canyon and Whychus Watersheds since 2002.

Fire	Year	Acres of National Forest Land
Deep Canyon Watershed		
Pole Creek	2012	4,568
Two Bulls	2014	487
Whychus Watershed		

Cache	2002	40
Black Crater	2006	5,147
Lake George	2006	1,857
GW	2007	186
Black Butte 2	2009	559
Rooster Rock	2010	1,362
Pole Creek	2012	22,512
	Whychus Total	**31663**

There are two ongoing timber salvage projects within the Whychus and Deep Canyon watersheds; the Pole Creek Fire Timber Salvage and Two Bulls Timber Salvage Projects. Approximately 54 acres of ongoing salvage logging is occurring within the Pole Creek Fire Timber Salvage project and approximately 250 acres of on going salvage logging is occurring within the Two Bulls Timber Salvage Project. These are ongoing projects that would and have removed fire killed trees reducing snag densities and snag habitat in the watersheds. The Two Bulls project does not occur within the range of the northern spotted owl and therefore does not impact habitat. Pole Creek Fire Timber Salvage Project does not propose to remove spotted owl NRF or dispersal habitat. The Pole Creek Fire Timber Salvage project occurs within ECN 8.

The Ursus Hazardous Fuels Reduction Project occurs in the Deep Canyon watershed. The project proposes to thin green stands of mixed conifer from below, removing over story lodgepole pine infected with dwarf mistletoe and salvage log dead lodgepole pine and white-fir. This project is approximately 5,900 acres and does not occur in spotted owl critical habitat. The project would remove between approximately 1,859-1,883 acres of dispersal habitat depending on the selected alternative. A determination was made that because the Ursus project has no indirect or direct to spotted owl NRF habitat or designated critical habitat there would be no cumulative effects to NRF or designated critical habitat as a result of the proposed actions under either alternative. The Ursus project may affect but would not likely adversely affect the northern spotted owl due to the reduction of dispersal habitat in the project area, although this would not likely create a barrier to movement due to the juxtaposition of the project area with inventoried roadless areas as well as no treatment areas within the project boundary.

The Bend Municipal Watershed Fuels Reduction and the Bear Wallow Firewood Projects are within mixed conifer or lodgepole pine habitat types. Both projects occur within the Deep Canyon watershed. However, these projects do not occur within ECN 8. Only one project occurs within spotted owl Critical Habitat, the Bend Municipal Watershed Project, and it occurs in ECN 9. These areas are associated with high levels of bark beetle mortality in lodgepole pine stands. These project areas would directly remove snags to disrupt fuel continuity within these areas and therefore would reduce snag and log habitat. In addition, these projects would thin stands from below reducing stand densities. No suitable spotted owl NRF habitat would be removed as result of these projects. Overall, the projects would reduce fuel densities on approximately 910 acres. These projects are designed to reduce the risk of loss of existing habitat from future large-scale disturbances.

Personal use firewood cutting is occurring within the 3,029 acre Three Creek's Firewood Cutting Area. Individual dead trees are being removed for personal use firewood primarily within the road prism of

open roads. Cutting is not wide spread and occurs on a site specific basis where individual trees are removed or small groups of dead trees. Only dead lodgepole pine and white-fir can be utilized for firewood.

The silvicultural treatments, including prescribed fire, associated with the Whychus and Deep Canyon watersheds would accelerate the development of large tree structure in mixed conifer which would provide positive benefits for owl habitat in the long-term (i.e., greater than 30 years post-implementation). Treatments would select and retain the healthiest and largest trees that would be the most resilient to the effects of fire. Within lodgepole pine stands, the focus would be to remove concentration of dead trees, and promote natural regeneration. Lodgepole pine treatments would not remove spotted owl habitat but would promote the development of fully stocked overstory stands. The intent of the treatment is to maximize the utility of green lodgepole pine stands for spotted owl dispersal during the 100 year rotation and before the next infestation of the mountain pine beetle. However, mixed conifer thinning from below would occur and would directly reduce dispersal habitat.

Conclusion—Alternatives 2 and 3

In conclusion, Alternatives 2 and 3 in the Melvin Butte project area would not impact NRF habitat; therefore there is ***No Effect*** to the spotted owl. Alternatives 2 or 3 would reduce approximately 1,882 acres of dispersal habitat, retaining 914 acres of the largest concentrated blocks of dispersal habitat; therefore the project ***May Affect but is Not Likely to Adversely Effect*** designated Critical Habitat. The project is consistent with the 2011 Revised Recovery Plan and the 2013 Critical Habitat Rule. The project is consistent with the Deschutes National Forest Plan standards and guidelines, as amended. A Letter of Concurrence was issued by the U.S. Fish and Wildlife Service on March 5, 2015.

Oregon Spotted Frog, Threatened

Measure: Effects to breeding, reproduction, and rearing habitat

Existing Condition

The Oregon spotted frog inhabits the margins of lakes, marshes, and pools in streams where there is an abundant growth of vegetation (Csuti et al. 2001). Literature cited in the Conservation Assessment (Cushman and Pearl, 2007) describes spotted frog breeding habitat as moderate to large wetlands with extensive emergent marsh coverage that warms substantially during seasons when Oregon spotted frogs are active on the surface (February to May). Sites always include some permanent water juxtaposed to seasonally inundated habitat.

Conclusion

No habitat exists for the Oregon spotted frog within the Melvin Butte project area. No Oregon spotted frog Critical Habitat Exists within the Melvin Butte project area. There is ***No Effect*** to the Oregon spotted frog as a result of the Melvin Butte project. There is ***No Effect*** to Oregon spotted frog Critical Habitat as a result of the Melvin Butte project. No further analysis is required.

Sensitive Species

Table 21 lists 22 Regional Forester sensitive species known to occur or potentially occur on the Deschutes National Forest. Based on a review of records and habitat requirements, the following sensitive species have potential habitat in the project area and may be impacted by the proposed action: western bumblebee, Johnson's hairstreak, Townsend's big-eared bat, fringed myotis, pallid bat, wolverine, white-headed woodpecker, and Lewis' woodpecker.

Table 21: Regional Forester Sensitive Species occurring or potentially occurring on the Deschutes National Forest.

Regional Forester Sensitive Species				
INVERTEBRATES				
Species	Status	Habitat	Habitat /Presence in Project Area	Effect
Western bumblebee (*Bombus occidentalis*)	**Sensitive**	**Forest edges, gardens, near houses and urban areas**	**Existing habitat**	**May Impact**
Johnson's hairstreak (*Callophrys johnsoni*)	**Sensitive**	**Mixed forests with dwarf mistletoe**	**Existing habitat**	**May Impact**
Silver-bordered fritillary (*Boloria selene*)	Sensitive	Bogs and wet meadows	No habitat	No impact
Crater Lake tightcoil (*Pristiloma articum crateris*)	Sensitive	Perennial riparian areas	No habitat	No impact
Evening field slug (*Deroceras hesperium*)	Sensitive	Perennial wet meadows	No habitat	No impact
AMPHIBIANS				
Columbia spotted frog (*Rana luteiventris*)	Federal Proposed, Sensitive	Shallow lakes, ponds	No habitat	No impact
MAMMALS				
Townsend's big-eared bat (*Corynorhinus townsendii*)	Sensitive, MIS	Caves, mines, bridges, buildings, rock outcrops,	No habitat	No Impact
Fringed myotis (*Myotis thysanodes*)	**Sensitive**	**Caves, mines, bridges, buildings, rock outcrops, snags in conifer forests, desert**	**Existing habitat**	**May Impact**
Pallid bat (*Antrozous pallidus*)	**Sensitive**	**Caves, mines, bridges, buildings, rock outcrops, snags in**	**Existing habitat**	**May Impact**

		conifer forests, desert		
Spotted bat (*Euderma maculatum*)	Sensitive	Cliffs, caves, rock outcrops in sagebrush/desert habitat	No habitat	No Impact
North American wolverine (*Gulo gulo luscus*)	**Sensitive, MIS**	**Mixed forests, High elevation**	**No denning habitat; low potential for dispersal habitat**	**No Effect**
Pacific fisher (Martes pennant)	Sensitive	Mixed conifer forests, high elevation	No habitat	No effect
BIRDS				
Lewis' woodpecker (*Melanerpes lewis*)	**Sensitive, MIS**	**Open ponderosa pine snags, burned areas**	**Existing habitat**	**May Impact**
White-headed woodpecker (*Picoides albolarvatus*)	**Sensitive, MIS**	**Large-diameter ponderosa pine snags**	**Existing habitat**	**May Impact**
American Peregrine Falcon (*Falco peregrinus anatum*)	Sensitive, MIS	Riparian, Cliffs	No habitat	No Impact
Bald eagle (*Haliaeetus leucocephalus*)	Sensitive, MIS	Lakes, snags	No habitat	No Impact
Greater sage grouse (*Centrocercus urophasianus)*	Sensitive	Sagebrush flats	No habitat	No Impact
Bufflehead (*Bucephala albeola*)	Sensitive	Lakes, snags	No habitat	No Impact
Northern waterthrush (*Seiurus noveboracensis)*	Sensitive	Riparian streambanks with dense willows	No habitat	No Impact
Harlequin duck (*Histrionicus histrionicus*)	Sensitive	Rapid streams, Large trees	No habitat	No Impact
Horned grebe (*Podiceps auritus*)	Sensitive	Lake	No habitat	No Impact
Tricolored blackbird (*Agelaius tricolor*)	Sensitive	Lakeside, bulrush (cattails)	No habitat	No Impact
Yellow Rail (*Coturnicops noveboracensis*)	Sensitive	Marsh	No habitat	No Impact
Tule greater white-fronted goose (*Anser*	Sensitive	Nests on marshy ponds in the tundra; winters in	No habitat	No Impact

albifrons)		open country		

Rationale for Regional Forester Sensitive Species Not Analyzed in Detail

Silver-bordered fritillary

This butterfly ranges from Central Washington south along the Rocky Mountains to northern New Mexico and east to Illinois, Virginia and Maryland. They inhabit wet meadows, bogs, and marshes as well as forest openings in mountainous areas, and spring-fed meadows in dry prairies (NatureServe 2012). Two primary colonies exist in Oregon: one at Big Summit Prairie on the Ochoco National Forest and one in the Strawberry Mountains in the Malheur National Forest (Miller and Hammond 2007). Threats to this species include livestock overgrazing, wetland loss, and woody vegetation encroachment of willows and hawthorns from fire suppression (Miller and Hammond 2007). Adults lay eggs singly near host plants of the violet family including *Viola glabella* and *V. nephrophylla*. Caterpillars that develop from the eggs feed on these host plants and overwinter by hibernating, emerging as adults in the spring. Favored nectar sources for adults are composite flowers including goldenrod and black-eyed susans. Adults fly May to July with a second generation flying from August into September. There are no proposed treatment activities in riparian habitat. Alternatives 2 or 3 would have ***No impact*** on the silver-bordered fritillary.

Crater Lake tightcoil

This snail can be found in suitable wet habitat on the undersides of woody debris, among wet mosses, rushes, and other low vegetation at the edges of wetlands, springs, seeps, and streams in perennially damp forest floor litter, especially where it has accumulated at the bases of shrubs and against logs (Duncan et al. 2003). Suitable wet habitat would be considered as almost exclusively very stable, perennially wet riparian edges around wetlands, springs, seeps, streams, and damp forest floor. Areas that are temporarily wet habitat such as stream borders that may change location (up and down the stream bank) or are seasonally underwater or dry, are not suitable habitat for this species. Only areas with constant water levels that create perennially saturated habitat year-round are suitable and may be occupied. There are no proposed treatment activities in riparian habitat. Alternatives 2 or 3 would have N***o Impact*** on the Crater Lake tightcoil.

Evening fieldslug

According to Duncan (2005), the evening fieldslug is associated with perennially wet meadows in forested habitats. Microsites include a variety of low vegetation, litter, and debris; rocks may also be used as refugia. This species appears to have high moisture requirements and is almost always found in or near herbaceous vegetation at the interface between soil and water, or under litter and other cover in wet situations where the soil and vegetation remain constantly saturated. Typical landscape features that may provide constant moisture conditions include springs and seeps, as well as wetlands in depressions and around perennial ponds. There are no proposed treatment activities in wet meadows, springs, or seeps. Alternatives 2 or 3 would have ***No Impact*** on the evening fieldslug.

Columbia spotted frog

Columbia spotted frogs inhabit the margins of lakes, marshes, and pools in streams where there is an abundant growth of vegetation (Csuti et al. 2001). There are no proposed treatment activities in standing water, streams (intermittent or perennial) or riparian areas. This species is not known to occur on the Sisters Ranger District. Alternatives 2 or 3 would have ***No Impact*** on the Columbia spotted frog.

Townsend's big-eared bat

The Townsend's big-eared bat is a Regional Forester Sensitive Species and a Forest Plan Management Indicator Species. The following information is summarized from the 2012 Forest-wide habitat assessment for the Townsend's big-eared bat (USDA Forest Service 2012a). This species is dependent on cave or cave-like structures (buildings) year-round in mixed conifer forests, deserts, and agricultural areas. Foraging associations include edge habitats along streams and in forested habitats, particularly in sagebrush steppe and open ponderosa pine stands. There are no known caves in the project area. They are known to occur in a cave during fall and winter several miles north of the project area. They are assumed to seasonally migrate from the cave north of the project area to caves or cave-like structures in lower elevations during spring and summer. They were documented roosting in forested lava flows on the Deschutes National Forest during spring migration (Dobkins 1995). It is considered stable or slightly decreasing on the Deschutes National Forest (USDA Forest Service 2012a). The project are does not contain caves or cave like structures/rock outcrops that provide roosting habitat that would promote dispersal. Alternative 2 or 3 would have ***No Impact*** on the Townsend's big-eared bat.

Spotted bat

The spotted bat is mostly found in desert and canyon habitats. They roost in caves, mines, rock outcrops, and especially crevices in tall vertical cliffs. Roosts are usually near a source of water, but this does not appear to be a main requirement for roosting locations. Winter hibernation sites are poorly known. NatureServe (2012) considers the spotted bat to be widespread in western North America with sparse populations but it may be more common than formerly believed. Abundance, population trends, and threats are largely unknown. This species has not been documented on the Deschutes National Forest but has been detected adjacent to the Deschutes National Forest at Lake Billy Chinook east of the Sisters Ranger District and in Dry River Canyon near Highway 20 north of the Bend-Ft. Rock Ranger District. Potential habitat exists on the eastern fringe of the Deschutes National Forest but not in the project area. Alternatives 2 or 3 would have ***No Impact*** on the Pallid bat.

American peregrine falcon

In Oregon, the peregrine falcon nests on cliffs ranging in height from a 75-foot escarpment at a reclaimed quarry to monolithic 1,500-foot high cliffs, as well as structural features of bridges (Joel E. Pagel *in* Marshall et al. 2006). There are no high escarpments, cliffs, or tall bridges in the project area. Alternatives 2 or 3 would have ***No Impact*** on the peregrine falcon.

Bald eagle

Suitable habitat for the bald eagle is characterized by the presence of large (mature) trees generally >32

inches dbh. Ponderosa pine and Douglas fir trees with large open limb structures are preferred for nesting on the Deschutes National Forest. Other habitat attributes are the availability of prey, usually within one mile of their nesting territory, and a large water body. Reproductive or foraging habitat for the bald eagle does not occur in the project area. The closest known nest site is six miles from the project area. Alternatives 2 or 3 would have ***No Impact*** on the bald eagle.

Greater sage grouse

The greater sage grouse is found in foothills, plains, and mountain slopes where sagebrush is present and the habitat contains a mixture of sagebrush, meadows, and aspen in close proximity. Winter habitat (palatable sagebrush) is probably the most limited seasonal habitat in some areas (NatureServe 2012). Sagebrush habitat in or adjacent to the project area does not exist. Alternatives 2 or 3 would have ***No Impact*** on greater sage grouse.

Bufflehead

The bufflehead typically nests at high-elevation forested lakes in Central Oregon, using cavities or artificial nest boxes in trees close to water, with most nests within 75 feet of water, but sometimes as far as 650 feet away (Marshall et al. 2003). The birds nest in natural cavities or abandoned northern flicker holes in mixed coniferous-deciduous woodlands near lakes and ponds. There are no lakes or ponds in the project area. Alternatives 2 or 3 would have ***No Impact*** on the bufflehead.

Northern waterthrush

The northern waterthrush inhabits riparian habitat, often with willow and alder (NatureServe 2012). There are no proposed treatment activities in stream or riparian habitat. Alternatives 2 or 3 would have ***No Impact*** on the northern waterthrush.

Harlequin duck

The harlequin duck nests along fast-moving rivers and mountain streams on rocky islands or banks. It requires relatively undisturbed, low gradient, meandering mountain streams with dense shrubby riparian areas (greater than 50% streamside shrub cover), and woody debris for nesting and brood rearing; also needs mid-stream boulders or log jams and overhanging vegetation for cover and loafing; indicator of high water quality (Spahr et al. 1991). There are no proposed treatment activities in stream habitat or riparian in the project area. Alternatives 2 or 3 would have ***No Impact*** on the harlequin duck.

Horned grebe

The horned grebe is a rare breeder east of the Cascades and favor semi-permanent ponds (Marshall et al. 2003). They nest among tall vegetation in shallow water on small and large lakes and ponds (approximately ¼ acre or larger), in calm waters of marshes, along rivers and streams. The highest breeding densities occur in pothole marshes of aspen woodlands. Outside the breeding season, horned grebes are found on bays, estuaries and seacoasts, and in migration commonly in inland freshwater habitats, especially lakes and rivers (NatureServe 2012). There are no proposed treatment activities in

stream or riparian habitat in the project area. Alternatives 2 or 3 would have ***No Impact*** on the horned grebe.

Tricolored blackbird

In Oregon, this species is restricted to breeding in southern Oregon and prefers to breed in freshwater marshes with emergent vegetation (cattails) or in thickets of willows or other shrubs (Csuti et al. 2001). In migration and winter they are found in open cultivated lands and pastures (NatureServe 2012). There are no marshes with emergent vegetation in the project area. There are no proposed treatment activities in marshes with cattails and tules Alternatives 2 or 3 would have ***No impact*** to the tri-colored blackbird.

Yellow rail

The nesting habitat of the yellow rail in southcentral Oregon was described as marshes or wet meadows with an abundance of thin-leaved sedges, a layer of senescent (old) vegetation to conceal their nests, and water depths of 0.5 to 5 cm (Popper and Stern 2000). There are no proposed activities in wet meadows or riparian areas. Alternatives 2 or 3 would have ***No Impact*** to the yellow rail.

Tulewhite-fronted goose

Tule greater white-fronted geese use Oregon as a stop-over location during migration. They prefer marshes and feed more in lower elevation wetland habitat and less in agriculture fields (NatureServe 2012). There are no proposed treatment activities in marshes or tules. Alternatives 2 or 3 would have ***No Impact*** to the tule greater white-fronted goose.

Western Bumblebee

Measure: Impacts to flowering plants, Nest sites, and hibernation sites

The western bumblebee was once widespread and common throughout the western United States and western Canada before 1998. Since 1998, populations of this bumblebee species have declined drastically throughout parts of its former range. Populations in central California, Oregon, Washington, and southern British Columbia have mostly disappeared. NatureServe (2012) reported this species has declined about 70-100% since the late 1990s in many places, especially from British Columbia to California. Other recent observations in Oregon were documented in Wallowa County in 2008 and near Mt. Hood in 2009 (NatureServe 2012). Observations associated with the Deschutes National Forest have been as recent as 2014 within meadows in the areas of Sunriver, Sparks Lake, Todd Lake, Green Lakes, and Canyon Creek Meadow (on the Sisters Ranger District).

Habitat alterations including those that could destroy, fragment, alter, degrade or reduce the food supply produced by flowers, as well as destruction of nest sites and hibernation sites for overwintering queens, such as abandoned rodent burrows and bird nests, adversely affect these bees. Agriculture and urban development alter landscapes and habitat required by bumblebees. The size of bumblebee populations diminish and inbreeding becomes more common as habitats become fragmented. This in turn decreases the genetic diversity and increases the risk of population decline (NatureServe 2012).

When exotic plants invade and dominate native grasslands, they may threaten bumblebees by competing with the native nectar and pollen plants relied upon by bumblebees. A small invasive parasite of the honeybee, the small hive beetle (*Aethina tumida*), can also infest bumblebee colonies. Although it has not been well studied it could severely impact bumblebee colonies. The invasion of exotic plants and insects should be restricted as much as possible by reducing the rate of introduction of new species and by controlling populations of invasive species (NatureServe 2012).

This species has been observed on the Sisters Ranger District but there is currently no district or Forest data to determine acres of suitable habitat. Since there are flowering plants within the project area it is assumed that it may potentially provide western bumblebee habitat. Flowering shrubs exist in the project area exist in the form of manzanita and ceanothus. Manzanita primarily occurs within the lower elevation ponderosa pine community, whereas ceanothus is highly associated with Pole Creek Fire in the western edge of the project area. Habitat for nest sites and hibernation sites are also likely available within the project area.

Alternative 1 – (No Action) Ecological Trend

The No Action alternative would result in no immediate impact to western bumblebees since no vegetation management actions would occur to reduce flowering plant populations or alter or destroy nest and hibernation sites. Potentially suitable habitat would be maintained based on the wide spread presence of ceanothus and manzanita across the ponderosa pine community and western edge of the project area.

Alternatives 2 and 3 - Direct and Indirect Impacts

The selection of either action alternative would result in the temporary crushing of flowering plants (after project completion, flowering plants, especially the dominant forbs are expected to recover) and potential destruction of nest/hibernation burrows by large machinery. On average, approximately 20% of the project area is not proposed for treatment providing and flowering shrubs and other plants for bumblebees. Retention would maintain the presence of undisturbed ground and flowering plants widely distributed across the entire 5,375 acre project area.

The project proposes to treat approximately 4,437 acres. Based on the proposed silviculture and fuels treatments approximately 60%-61% (3,231-3,295 acres) could temporarily reduce flowering plants across the forested acres of the project area. In Alternative 2 approximately 0.8 miles of temporary roads would be constructed removing all flowering shrub and forb habitat within the road prism. However, both alternatives propose to close approximately 6 miles of road and decommission approximately 8 miles of road. These actions could potentially promote additional acres of flowering plants and shrubs. Alternative 2 would have the greatest impact because of the larger treatment footprint creating a higher potential of destructing nest/hibernation burrows and the greatest potential loss of a food source by crushing vegetation during harvest treatments. Fuels treatment such as mastication and burning have a high potential of direct mortality of bee individuals due to treatment most likely occurring in the spring when plants are flowering. This alternative presents the greatest potential of crushing or disturbing a nest or hibernation site. In the long term, however, reduced canopy cover and prescribed burning is expected to increase the abundance of flowering plants and be beneficial to the Western bumblebee.

Alternative 3 disturbs less acreage (3,231 acres (60% of the forested acres)) than Alternative 2.

Alternative 3 has the smallest treatment footprint within the forested acres, would have a lower potential to destroy nest/hibernation burrows, the least potential loss of the bumblebees food source by crushing vegetation during harvest activities and mowing and loss during prescribed fire, and a decreased potential of direct mortality to individual bees.

Impacts are expected to be short-term as the potential to destroy a nest/hibernation burrow would diminish after project activities are complete and flowering shrubs and other flowering plants affected by burning and activity fuels treatment regrow within a 5-10 year period to pre-disturbance conditions.

Alternatives 2 and 3 - Cumulative Impacts

For this species, cumulative effects were bounded by the Deep Canyon watershed based on the limited scale of the proposed actions in relation to the size of the watersheds, the availability of habitat outside of regulated timber harvest and mechanized use (e.g. Wilderness and inventoried roadless areas), and the general lack of flowering shrubs and forbs within the project area. Past actions were considered in the existing condition of habitat and the cumulative effects of ongoing and reasonably foreseeable actions taken into account.

Two large wildfires have occurred within or partially within the Deep Canyon watershed –the Pole Creek and the Two Bulls Fires. Approximately 54 acres of the Pole Creek Salvage are ongoing and approximately 250 acre is being salvaged in association with the Two Bulls Fire. Danger tree removal occurred on these fires to varying degrees. Impacts to rodent burrows used by the Western bumblebee for nesting and overwintering could occur from these project. There are no additive impact to species habitat as a result of these projects.

There would be additive impacts from the Ursus Hazardous Fuels Reduction Project. The project is approximately 5,900 acres in size and is associated with approximately 3,434 acres of the Deep Canyon Watershed. The Ursus project proposes to break up the fuel continuity across the project area, removing dead and dying trees associated with insects and disease outbreaks in the eastside mixed conifer, montane mixed conifer, and lodgepole pine habitat types. The project would impact approximately 68% to 69% of the forest habitat that has the potential to provide habitat. Thinning and fuels reduction efforts under both project proposals would impact potential bumblebee habitat in the short term by reduction in flowering shrubs and possible collapse of rodent burrows due to the use of machinery. In total, between the two action alternatives, approximately 4,050 – 4,111acres of the Ursus project could impact bumblebee habitat within the Deep Canyon watershed.

The Bend Municipal Watershed Fuels Reduction and the Bear Wallow Fire Wood Projects are primarily associated with montane mixed conifer habitat and lodgepole pine, totaling approximately 910 acres. Both projects affect bumblebee habitat within 150 feet on either side of roads scheduled for treatment. Since these projects focus on the removal of dead trees they would have limited impacts to bumblebee habitat and the majority of the impacts would be short term by crushing of flowing plants and shrubs as a result of removing standing dead and down snags and logs. The proposed actions under Melvin Butte would not have additive effects.

Determination

Alternative 2 would have the greatest potential to impact western bumblebees because of the larger acreage of forested habitat that would be treated by harvest and fuels activities, creating a higher potential to destroy nest/hibernation burrows and reducing the amount of food source available by crushing plants during harvest treatments and mastication of fuels. Alternative 3 would have the least impact. However, 20% of the project area (including harvest and fuels activities and depending upon the alternative chosen) would remain unchanged, including a majority of the Deep Canyon watershed retained in roadless and Wilderness areas. It is assumed species presence would still be maintained with either of these alternatives. Based on these assumptions, the Melvin Butte project ***May impact individuals or habitat, but would not likely contribute to a trend toward federal listing for the western bumblebee***.

Fringed myotis and Pallid bat

Measure: Roosting and foraging habitat impacted

Existing Condition

The Northwest Forest Plan calls for retaining snags, decadent trees, and green tree recruitment for roosting bats in Matrix and Adaptive Management Areas (Page B-7, Stand Management):

"Adequate numbers of large snags and green trees are especially critical for bats because these trees are used for maternity roosts, temporary night roosts, day roosts, and hibernacula. These should be well distributed throughout the matrix because bats compete with primary excavators and other species that use cavities. Day and night roosts are often located at different sites, and migrating bats may roost under bark in small groups. Thermal stability within a roost site is important for bats, and large snags and green trees provide that stability. Individual bat colonies may use several roosts during a season as temperature and weather conditions change. Large, down logs with loose bark may also be used by some bats for roosting."

Snag densities are poorly known for most species of bats but some research indicates that snag density requirements may be higher than those needed for woodpeckers (Lacki et al. 2008). Bats frequently switch roosts to escape predation and avoid parasites (Lewis 1995, Barclay and Kurta 2007).

Two sensitive bat species have potential habitat in the project area.

Fringed Myotis

The following information is summarized from the Western Bat Working Group Species Account for the Fringed myotis (Western Bat Working Group 2005a).

The fringed myotis is a small bat distributed patchily throughout the west. It occurs at 3,900 to 6,900 feet and is most common in drier woodlands (oak, pinyon-juniper, ponderosa pine) but can also be found in desert scrub, mesic coniferous forest, grassland, and sage-grass steppe. It roosts in large decadent trees and snags, crevices in buildings, underground mines and caves, rocks, cliff faces, and bridges. It is likely that structural characteristics (e.g. height, decay stage) rather than tree species play a

greater role in selection of a snag or tree as a roost. The two most commonly reported orders in its diet are beetles and moths. This species is adapted for foraging within the forest interior and along forest edges.

Threats include loss or modification of roosting snag habitat, closure or renewed activity at abandoned mines, recreational caving and mine exploration, replacement of buildings and bridges with non- bat friendly structures, loss of clean, open water, and loss of prey species due to pesticides/chemicals.

No winter records of this species in caves on the Deschutes National Forest have been documented. One record during summer surveys with the use of mist-nets was documented at the south end of the Bend-Ft. Rock Ranger District in 1992. Summer surveys have not occurred on the Sisters Ranger District. This species potentially occurs in snags in the project area.

Pallid Bat

Pallid bats day and night roosts include crevices in rocky outcrops and cliffs, caves, mines, trees (*e.g.*, basal hollows of coast redwoods and giant sequoias, bole cavities of oaks, exfoliating ponderosa pine and valley oak bark, deciduous trees in riparian areas, and fruit trees in orchards), and various human structures such as bridges, barns, porches, bat boxes, and human-occupied, as well as, vacant buildings (Western Bat Working Group 2005b). Roosts generally have unobstructed entrances/exits, and are high above the ground, warm, and inaccessible to terrestrial predators (Western Bat Working Group 2005b). Although year-to-year and night-to-night roost reuse is common, they may switch day roosts on a daily (1 to 13 days) and seasonal basis (Western Bat Working Group 2005b).

Recent research in northern California in the Plumas National Forest showed that pallid bats used cavities in large diameter trees and snags (>21 inches dbh) in mixed coniferous forests at elevations greater than 3,800 feet (Baker et al. 2008). The diet of pallid bats is varied including such insect taxa as beetles, centipedes, crickets, moths, scorpions, and termites. The pallid bat has only been documented once on the Deschutes National Forest on the Sisters Ranger District. The documentation was within low elevation late and old Structure ponderosa pine habitat. The majority of documented species have occurred on adjacent Bureau of Land Management lands in the southeastern corner of the Bend-Ft. Rock Ranger District.

Snag Habitat and Snags Associated with Post Fire Habitats

Bats use of trees and snags includes cavities in hollow trees, cracks or crevices in trees or snags, or behind exfoliating (sloughing) bark. They may be less likely to use heavily charred/sooty fire-killed trees if a sufficient number of roost trees are available in the surrounding area. The 2012 Pole Creek fire that is within and adjacent to the Melvin Butte project likely removed some roost habitat while creating additional roost habitat.

A small portion of the project area (approximately 642 acres) is associated with the Pole Creek Fire along the western edge of Forest Road 16. Burn severity is variable along the road ranging from a light underburn to stand replacement fire. Little is known about the roosting ecology of bats and their prey in burned forests. Limited research has focused on short-term bat foraging activity in burned areas with varying types of severity (Hayes 2009, Buchalski et al. 2013). In general, low intensity wildfires and prescribed fire create relatively few snags (Horton and Mannan 1988) and many are small diameter,

which are of less use for most roosting bat species which usually prefer large-diameter (>21 inches dbh) roost trees (Barclay and Kurta 2006). For species that avoid foraging in dense forests, bat activity may increase in post-fire areas due to increased insect productivity and more open foraging conditions at least for the first year after the fire (Buchalski et al. 2013). During this one year post-fire study, Buchalski et al. (2013) show that bat activity was either neutral or positive regardless of the intensity of the fire.

Lacki et al. (2012) monitored 301 roost snags of long-legged myotis in Oregon, Washington, and Idaho. This is one of the most common bat species occurring on the Deschutes National Forest. Overall, persistence rates declined with increasing roost-years across study areas. Roost snags in Washington showed a lower persistence rate 1 year post-discovery than did roost snags in Oregon and Idaho. Estimates of the percentage of snags still standing 10 years post-discovery were highest for ponderosa pine (6.8%), slightly less for Douglas-fir (5.3%), and lowest for grand fir (0.9%). They found half-lives of roost snags to be <3 roost-years, much shorter than other published values for half-lives of snags of multiple species of conifers (Russell et al. 2006, Angers et al. 2010), and the overall average of roost snag persistence 10 years post-discovery across snag species was 4.3%. Replenishment of snags suitable for long-legged myotis on an annual basis is likely needed to ensure adequate habitat of this bat species, especially given the frequency of roost switching within years shown by many bats (Lewis 1995, Barclay and Kurta 2007) and the short-term reuse of tree roosts among years.

Large trees and snags would be retained in all treatment areas. Thinning from below would reduce dense forest patches but improve foraging conditions for bats at least in the short-term, particularly where viable roosting habitats occur within close proximity to water.

The project area provides suitable naturally occurring and post fire snag habitat for Pallid Bat and Fringed Myotis.

Alternative 1 – No Action (Ecological Trend)

Under the No Action Alternative no treatments would occur within Melvin Butte project area. Development of future old growth within second growth ponderosa pine and mixed conifer stands would be prolonged and the existing old trees within stands would continue to be stressed, decreasing their longevity. However, stands would continue to provide habitat in the short-term. In the long-term, in the absence of a stand replacement fire or an insect outbreak, stands containing disease would continue to die and the multi-storied structure would diminish along with any remnant old growth trees. As a result, snags would be recruited for roosting, but overstory canopy would diminish, changing the stand structure bats depend on for foraging. Due to stand densities within the project area and increases in mortality overtime, the risk of large scale stand replacement fire across the Melvin Butte project area increases over time, potentially impacting bat habitat.

Overall, high stand densities would result in a decrease in tree vigor among all size classes. The most significant effect of high stand densities would be lack of canopy closure and the loss of the existing historic large-tree component which is likely to occur at a much higher rate than if stand densities were reduced to more sustainable levels. Suitable forested habitat for these species consist of late and old structure forests with low densities of large snags. This forest type provides ample canopy closure under which bats can forage on insects, additionally providing large snags with sloughing bark that

provide high quality day roosting habitat. In the short-term higher densities of snags would exist with little canopy closure rather than slowly recruiting larger snags overtime that provide better roosting habitat for both the Pallid and Fringed Myotis bat species. In the long-term the area would lack large tree structure and suitable day roost sites for these species.

Alternative 2 and 3 - Direct and Indirect Effects

Thinning From Below (HTH), Mixed Conifer Thinning with Group Openings (MCGO), Mixed Conifer Thinning without Group Openings (MC-without openings), Non-commercial Thinning (P), Prescribed Burning (B) and Scenic Views Enhancement.

Commercial thinning (HTH) and Mixed Conifer Thinning with and without group openings (MCGO and MC - without openings) would consist of primarily thinning from below removing trees >8"dbh. Treatments would focus on maintaining the overstory trees in pure ponderosa pine and mixed conifer stands providing overstory large tree structure. Treatments would retain and promote the development of overstory ponderosa pine by reducing site competition. Within mixed conifer treatments these stands are dominated by small trees and would focus on reducing stand densities primarily removing second growth lodgepole pine and white-fir, favoring healthy white-fir and ponderosa pine. This treatment would result in the accelerated growth of residual trees while reducing the fire hazard. Long-term beneficial impacts of small tree thinning would be the reduction of habitat fragmentation by promoting the development of LOS habitat which include large snags at an accelerated rate. Short-term beneficial impacts would be seen in the reduction of risk to existing suitable habitat. This treatment would beneficial to the Pallid and Fringed Myotis bats by creating large snags over the long-term that may be utilized as day roost habitat. Prescribed burning would occur as a follow up treatment. Some large tree mortality is likely to occur from prescribed burning, creating some roosting habitat in the short-term. However, it is likely that there would be an incidental loss of large snags as result of prescribed burning reducing some existing roosting habitat on a site specific basis.

Non-commercial thinning (P) would occur within ponderosa pine plantations that are approximately 20 to 40 years old. Treatments would consist of removing material primarily <8"dbh and occasionally up to 12" dbh material. These plantations do not currently provide high quality habitat for the Pallid and Fringed Myotis bats. In the long-term, thinning would reduce stand densities promoting the development of LOS ponderosa pine, recruiting large snags, and creating more highly suitable day roost and foraging habitat in these areas.

The Scenic Views Enhancement Treatment was developed to meet the scenic views objectives for the Forest Road 16 corridor. Treatments would remove small (<8 in. dbh) dense patches of fire killed trees to enhance the visual quality of Foreground areas. Treatment would retain all live trees and large snags to benefit scenic quality and maintain existing habitat. Treatments would not reduce roosting or foraging habitat.

The objective of prescribed fire is to reduce fuel loading to create a continuous mosaic of burned and unburned habitat. Treatments may unintentionally burn existing snags; however new snags could also be recruited through this process. Mortality of snags in ponderosa pine habitat during prescribed fire treatments in Arizona and California ranged from 20% (Randall-Parker and Miller 2002), 45% (Horton and Mannan 1988), and 56% (Bagne et al. 2008). All three studies found that larger diameter ponderosa

pine trees were least likely to die, at least in the short-term. Horton and Mannan (1988) found a 20-fold increase in abundance of snags < 15 cm dbh. Several studies showed that the highest snag losses were in areas where a long period of fire exclusion had occurred (Bagne et al. 1988, Holden et al. 2006). Bagne et al. (2008) and Horton and Mannan (1988) found that re-entry burns had a much lower mortality rate for snags, presumably because the trees that did not burn during the first entry were more resilient. Loss of snags from prescribed fire was partially mitigated by the creation of new snags (Horton and Mannan 1988, Bagne et al. 2008).

Table 22 summarizes the amount of habitat associated with treatments under each action alternative for the Melvin Butte project.

Table 22: Total acres of habitat associated with each treatment type by alternative.

Treatment Type	Alternative 2	Alternative 3
B	253	253
HTH	310	336
MC – No Group Opening	-	36
LPI	27	27
MCGO	36	-
P	493	493
Scenic Views Enhancement	41	41
Total Acres.	**1,160**	**1,186**

Overall, approximately 1,160 acres of habitat are associated with treatments identified under Alternative 2 and approximately 1,186 acres under Alternative 3. Alternative 2 is the most proactive on the landscape and provides the best opportunities to address fuel continuity while maintaining large tree habitat.

Overall, implementation of the action alternatives would maintain existing habitat conditions for the Palid and Fringed Myotis bats by maintaining and enhancing the development of large tree structure across the project area. Treatments reduce the risk of losing existing roosting and foraging habitat to stand replacement fire. Under Alternative 2, through thinning, small openings would be created by removing white-fir that are succumbing to insects and disease. Trees removed on average are approximately 14 inches dbh and would not likely provide roosting habitat. However, this treatment would create small openings among fully stocked forest stand canopies and could enhance foraging opportunities. Treatments would not preclude use of the project area by these species and would increase as contiguous stands of LOS habitat develops across the project area over the long-term (>30 years). These changes would result in more sustainable habitat conditions across the landscape and move habitat conditions closer to historical conditions. Fire suppression has created denser conditions than historically occurred which have resulted in a decline in large tree open stand structures on the landscape.

The project area and habitat varies greatly from north to south due to the increase in elevation, the rain gradient associated with the change in elevation, and the site potential associated with the inherent soil quality within this north to south pattern. To capture the importance of habitat variation across the project area, the project area was broken up into 3 areas containing high, medium and low site potential based on inherent soil quality. The retention strategy identified a range of retentions levels across the project area. Within stands containing low site productivity, untreated stands would be retained at a

10% level; in the areas with moderate site productivity dispersal untreated stands would be retained at a15% level; and in areas that have the highest site productivity dispersal untreated stands would be retained at the 20% level. Retention would occur on a stand by stand basis to retain areas that contain the highest densities of contiguous habitat with a stand average of a minimum of 11 inches dbh and exceeding 40% canopy closure. These untreated areas were identified to maintain habitat connectivity between thinned stands associated with project treatments.

Overall the action alternatives do not propose to remove any large snag habitat. However, due to prescribed burning in old growth ponderosa pine stands and thinning from below in multi-storied stands (B, HTH, MC, and MCGO) there is the potential for loss of some large snags (snags may also be felled as OSHA safety hazards) that provide roosting habitat on approximatley 599 acres under Alternative 2 and approximately 589 acres under Alternative 3.

See snag analysis for complete summary of impacts to snag habitat.

Alternative 2 and Alternative 3 – Cumulative Impacts

Activities identified in Tables X (cumulative effect table for wildlife) were reviewed to assess whether in combination with the likely impacts of the Melvin Butte project there would be any cumulative impacts to the Pallid and Fringed Myotis bat roosting and foraging habitat. The Deep Canyon and Whychus Watersheds are used as the scale for analysis for these species. The potential cumulative impacts are discussed below.

Two large wildfires have occurred within or partially within the Deep Canyon and Whychus watersheds – Pole Creek and the Two Bulls Fire. Approximately 54 acres of the Pole Creek Salvage are ongoing and approximately 250 acres are being salvaged in association with the Two Bulls Fire. Danger tree removal occurred on these fires resulting in a reduction of potential roost sites in stand replacement areas along main roads.

The Ursus Hazardous Fuels Reduction, the Bend Municipal Watershed Fuels Reduction, and the Bear Wallow Firewood Projects have occurred or may occur in suitable habitat. These projects focus primarily on removing dead lodgepole pine within green stands to reduce fuel loading; some of the activities are also associated with mixed conifer habitat. Overall, treatments would reduce the risk of loss of existing habitat from future large-scale disturbances. There are approximately 21,507 acres associated with these projects within the Deep Canyon watershed.

Overall, implementation of the Melvin Butte action alternatives as well as other projects within the watersheds should result in improved habitat conditions for those species dependent on open canopy forest habitats which could lead to increased populations in the long term. Cumulatively, there would be a decrease in dense understory habitat; these changes would result in more sustainable habitat conditions across the landscape and move habitat conditions closer to historical conditions.

Although treatments would thin stands that are currently suitable roosting and foraging habitat the project does not propose to remove large snags that provide roosting habitat. The Melvin Butte project would have minimal impacts to roosting and foraging within the Watershed or on the Deschutes National Forest for the Pallid and Fringed Myotis bats.

These projects are not expected to result in cumulative effects in combination with the Melvin Butte project and they would not have no impact on the Pallid and Fringed myotis habitat. No short or long-term bat population decrease would occur; therefore, additive cumulative impact are not anticipated.

Determination

Cumulatively, with the ongoing forest management projects within the Deep Canyon and Whychus watersheds, the Melvin Butte project does not propose to remove large snags within the mixed conifer and ponderosa pine habitat types except those posing hazards to operations under OSHA guidelines and snags lost incidentally to prescribe fire operations. Implementation of the project would not have measurable impacts to Pallid or Fringed Myotis bat habitat.

Based on these assumptions, the Melvin Butte project ***May impact individuals or habitat, but would not likely contribute to a trend toward federal listing for the Pallid and Fringed Myotis bats.***

Pacific Fisher Region 6 Sensitive

Measure: Effects to denning habitat and dispersal habitat

Existing Condition

The Pacific fisher primarily uses mature, closed-canopy coniferous forests with some deciduous component, frequently along riparian corridors (Csuti et al. 2001). In Ruggiero et al. (1994), it is suggested fishers prefer closed-canopy (greater than 60%), late-successional forests with large physical structures (live trees, snags, and logs), especially if associated with riparian areas. A 2004 Species Assessment by the US Fish and Wildlife Service documents key aspects of fisher habitat as those associated with late-successional forests (i.e. high canopy closure, large trees and snags, large logs, hardwoods, and multiple canopy layers). Distribution of fishers is limited by elevation and snow depth (Krohn et al. 1997); deep snowpack is largely avoided by fishers (Olson et al. 2014). Fishers generally avoid areas of high human disturbance, primarily high road density or recreational developments. Fishers are fairly large, weighing 3 to 13 lbs and 29 to 47 inches long. This may suggest a need of larger log sizes for dens than other animals with similar needs (e.g. marten). In southwest Oregon Aubry and Raley (2006) found fishers were denning and resting at 4,000 feet elevation, more than 80% canopy closure, and more than 16 snags and 67 logs at least 20" DBH per acre supporting the suggestion that this species utilizes large to very large structure. Denning and resting sites were also observed in large live trees (mostly Douglas-fir) with mistletoe brooms, limb clumping, rodent nests, or some other deformity. Fishers have been shown to avoid dry habitat types, which are frequently dominated by ponderosa and lodgepole pine; they are associated with montane mixed conifer and riparian habitat (Olson et al 2014). They also found fishers were preying upon woodpeckers, jays, grouse, quail, squirrels, hare, porcupine, and skunks. Most of these prey species can be found in the watershed.

The Melvin Butte project area is moderate to low elevation. The mixed conifer plant association associated with the project is dominated by ponderosa pine, white-fir, and lodgepole pine. No Douglas-fir exists within the project area. The project area contains two developed snow parks and receives

intensive recreation use in the winter months; snowmobile routes and Nordic routes exist within the project area.

Carnivore monitoring was conducted within the project area and within the watershed from 2012 to 2014 (McFadden and Hiller 2014). Monitoring was completed in conjunction with the Oregon Department of Fish and Wildlife. No Fishers were identified using the project area or the watershed as a result of the monitoring. Ongoing carnivore monitoring is occurring in the watershed; to date there has been no fisher detections.

Conclusion
There is no habitat for this species in the Melvin Butte project area, therefore there is ***No Effect*** to the fisher or its habitat. No further analysis is required.

North American Wolverine

Measure: Effects to denning habitat

Existing Condition

The wolverine is a Regional Forester Sensitive Species and a Deschutes National Forest Management Indicator Species. On February 4, 2013, the FWS proposed the wolverine for listing as a threatened species under the ESA primarily due to shrinking mountain spring snowpack as a result of climate change (USDI Fish and Wildlife Service 2013). On August 13, 2014 the Fish and Wildlife Service withdrew the proposed rule to list the distinct population segment of the North American wolverine occurring in the U.S. as a Threatened species.

Wolverines are primarily scavengers but also depend on a variety of prey items. In winter, they tend to den in the ground under snow or in rocky ledges or talus slopes (Ingram 1973). However, Copeland (1996) found they tended to prefer montane coniferous forest habitats during the winter. Wolverines make little use of young, thick timber and clear-cuts (Hornocker and Hash 1981).

Hornocker and Hash (1981) concluded that wolverine populations should be treated as regional rather than local whereas Edelman and Copeland (1999) suggested that wolverine populations move along corridors of mountainous habitats and that features such as the Columbia River Gorge and shrub-steppe habitats serve as barriers to dispersal. They also concluded that sightings occurring across the arid mountains of Central Oregon may suggest a movement corridor from the Cascade Mountains to the Wallowa Mountains.

Several historic sightings have been documented on the Sisters Ranger District near Suttle Lake and within the Mt. Jefferson and Mt. Washington Wilderness areas. Two aerial flights were conducted in the Three Sisters, Mt. Washington, and Mt. Jefferson Wilderness areas and adjacent roadless areas on the Sisters Ranger District in 1998 and 1999. There were no detections during the two flights. Baited camera systems placed near the wilderness boundary from 1997 through 1999 did not detect wolverine presence.

During the winter of 2012/2013 and 2013/2014 a research monitoring project using motion-detection cameras at bait stations and a hair snag system to collect samples for genetic analysis occurred on the Deschutes and Willamette National Forests. Target forest carnivores included the wolverine, the American marten, and a montane subspecies of red fox (Vulpes vulpes sp.). No wolverines were detected during this six month study.

A habitat assessment for the wolverine on the Deschutes National Forest was completed in 2012. Denning habitat was modeled from the Forest GIS Plant Association Group (PAG) layer including the alpine dry, alpine meadow, glacier and rock, and north aspect of 0-22.5 degrees and 337.5-360 degrees. The results from this were clipped using only the acres above 5500 feet in elevation. Of the 1,656 acres of wolverine denning habitat modeled for the Deschutes National Forest, 64 acres are in the Deep Canyon watershed. All of these acres are within designated Wilderness areas, primarily in the Three Sisters Wilderness area, with small areas in the Mount Jefferson Wilderness area. No denning habitat occurs in the Melvin Butte project area.

Wolverines appear to be extremely wide-ranging and unaffected by geographic barriers such as mountain ranges, rivers, reservoirs, highways, or valleys. Wolverines were documented using burned areas in Idaho (Copeland 1996) from immediately after the fire to up to several years after the event, presumably following ungulate herds. On the Deschutes National Forest, wolverine may travel through and or forage infrequently at lower elevations on the district but utilize higher elevations for most of their needs. Potential dispersal habitat occurs within the project area.

Alternative 1- No Action (Ecological Trend)

Under Alternative 1 (No Action) current Forest plans would continue to guide management of the project area; no thinning from below, mistletoe treatments, mowing or prescribed burning would take place to reintroduce natural fire back into these ecosystems, as well as reduce fuel loadings in the project area. In addition, no road closures or road decommissioning would occur to reduce disturbance to wolverine prey species.

Habitat conditions would remain constant in the short-term. Stand densities would continue to increase due to fire suppression. With increased stand densities comes increased risk of loss from disturbance events (insects, disease, or fire). These events would likely impact the densest stands the greatest due to the stand conditions and result in reduced availability of suitable habitat for prey species that utilize the project area.

Overall, since the project is not associated with wolverine habitat, the continuing ecological trend would not impact the wolverine or its habitat. The no action alternative could reduce available prey for the wolverine by reducing habitat for rodent populations in the project area. However, disturbance events such as wildfire could improve habitat for larger prey such as deer by increasing forage availability, post fire.

Direct and Indirect Impacts—Alternatives 2 and 3

The action alternatives would not remove any suitable habitat for the wolverine. Habitat identified within the watershed is not associated with the project area; therefore there would be no direct or indirect impact to the wolverine or its habitat.

Approximately 14 miles of road are proposed to be closed and decommissioned under the action alternatives. This action would reduce road densities in the project area from 5.98 mile/sq. mile to 4.66 miles/sq. mile. Road closures are not associated with suitable habitat; however, by reducing road densities it would reduce the amount of motorized disturbance to the project area. Road closures could potentially enhance the ability for wolverine to disperse through the project area.

There would be ***No Impact*** to the wolverine or its habitat under Alternatives 2 or 3.

Cumulative Impacts—Alternatives 2 and 3

The cumulative effects area for the wolverine is the Deep Canyon watershed. Because there are no direct or indirect impacts to the wolverine from the Melvin Butte project there would be no cumulative impacts to the wolverine. Therefore the Melvin Butte project would not contribute to a negative trend in viability on the Deschutes National Forest for the wolverine

Determination

The Melvin Butte project would have no direct and indirect impact to the wolverine or its habitat. There are no ongoing or reasonably foreseeable cumulative impacts to the wolverine. The Melvin Butte project would have ***No Impact*** to the wolverine or its habitat.

Lewis's woodpecker

Existing Condition

Formerly widespread, this species is common year-round only in the white oak ponderosa pine belt east of Mt. Hood. Habitat for the Lewis' woodpecker, a migrant in this part of its range, includes old-forest, single-storied ponderosa pine. Burned ponderosa pine forests created by stand-replacing fires provide highly productive habitats as compared to unburned pine (Wisdom et al. 2000). Lewis' woodpeckers feed on flying insects and are not strong cavity excavators. They require large snags in an advanced state of decay that are easy to excavate, or they use old cavities created by other woodpeckers. Nest trees generally average 17 to 44 inches (Saab and Dudley 1998, Wisdom et al. 2000). Known breeding has been documented in low numbers along Whychus Creek (Marshall et al. 2003) and in recent burned areas across the Deschutes National Forest.

In evaluating landscape predictor variables for the Lewis's woodpecker, Saab et al. (2002) found a negative relation to burned ponderosa pine/Douglas-fir stands with high crown closure (>70%) but was positively associated with low snag densities overall. However, although it selects for more open stands, this species selected nest sites with higher densities of large snags (>20"dbh) (Saab and Dudley 1998). Lewis' woodpeckers are different than other woodpeckers. They are aerial insectivores during the breeding season and use lower densities of smaller snags but rely more heavily on large snags (Saab and Dudley 1998). Habitat for Lewis' woodpecker will increase 5-10 years after in fire areas as smaller snags fall.

The Lewis' woodpecker is declining throughout its range. Threats to this species include the loss of suitable habitat, competition for nest trees, and the effects of pesticides on insects.

Abele et al. (2004) completed a Technical Conservation Assessment for the Rocky Mountain Region of the Forest Service. During the Assessment perceived threats to the conservation of the Lewis' woodpecker were identified:

1. The loss of breeding and wintering habitats in burned pine forests, park-like pine forests, riparian cottonwood stands, and woodlands.
2. Natural disturbances and management activities associated with them. For example a wildfire followed by salvage logging.
3. Fire Suppression within pine forests that have increased canopy cover (including increase of white fir) and reduced shrub and grass understories, which reduces insect populations that Lewis' woodpecker forage on and reduced aerial foraging areas.
4. Water regulation, which has altered riparian woodlands in the last two centuries.
5. Cattle grazing by altering the historic fire regimes with a reduction of understory vegetation. In addition, altering understory can influence the composition and abundance of prey.
6. Firewood cutting by reducing potential nest sites.
7. Competition with European starling and other cavity nesting species for nest sites.

Through the Forest wide assessment completed for MIS, Lewis' woodpecker reproductive habitat was mapped across the entire Deschutes National Forest. Habitat assessed for the Lewis woodpecker is associated with both green stands and post fire habitats. Approximately 122 acres of habitat occurs within Melvin Butte project area, 10,622 acres in the Deep Canyon and Whychus Watersheds, and approximately 85,015 acres of habitat occurs across the Deschutes National Forest (Table 23)

Table 23. Lewis woodpecker habitat within the Melvin Butte project area, Deep Canyon and Whychus Watersheds, and across the Deschutes National Forest.

Acres of Habitat in the Melvin Butte project area	Acres of Habitat in the Deep Canyon and Whychus Watersheds	Acres of Habitat Across the Deschutes National Forest
122 acres	10,622 acres	85,015

For the detailed assessment on the Lewis' woodpecker for the Deschutes National Forest, see the Forest-wide Species Assessment (USFS 2012).

There are no known Lewis' woodpecker nest sites within Melvin Butte project area.

Measure: Lewis' woodpecker habitat change in quality due to thinning and removal of fire killed trees in Scenic Views corridor.

Environmental Consequences

Alternative 1 – No Action (Ecological Trend)

Under the No Action Alternative no treatments would be prescribed within Melvin Butte project area. Without treatment the development of future old growth within second growth ponderosa pine and mixed conifer stands would be prolonged and the existing old trees within the would continue to be stressed, decreasing their longevity. However, stands would continue to provide habitat in the short-

term. In the long-term, in the absence of a stand replacement fire or insect outbreak, the stands containing disease would continue to die and the multi-storied structure would diminish along with any remnant old growth trees. Due to stand densities within the project area and increases in mortality overtime, the risk of large scale stand replacement fire across the Melvin Butte project area would increase.

Overall, high stand densities would result in a decrease in tree vigor among all size classes. The most significant effect of high stand densities would be the gradual loss of the existing historic large-tree component/nesting habitat which is likely to occur at a much higher rate than if stand densities were reduced to more sustainable levels.

Areas that currently provide suitable Lewis habitat would persist in the short-term, since this species prefers open ponderosa pine stands or post fire environments. Without treatments to thin from below within multi-storied ponderosa pine and mixed conifer stands, stand densities and the associated intraspecific competition among trees in the stands would reduce the longevity of residual old growth and large tree structure that occurs in these stands. In the long-term, available nest trees would be limited and the future development of large nest trees would be prolonged. In high density stands of second growth ponderosa pine containing mistletoe, in the short-term the mistletoe would reduce the resiliency of these stands against bark beetle attack. In the long-term, the second growth stands would likely contain bark beetle outbreaks and high densities of small snags that result in lack of recruitment of large tree structure over time, limiting suitable nesting habitat.

Alternative 2 and 3 - Direct and Indirect Effects

Thinning From Below (HTH)

The action alternatives propose thinning from below in Lewis' woodpecker habitat. Existing habitat in second growth ponderosa pine stands are an advanced stage of development where the majority of trees are beginning to reach maturity. In addition, there are residual old growth stands of ponderosa that would be thinned from below; these areas provide the most suitable habitat and would be greatly enhanced by thinning. On average trees identified for thinning would be approximately 12-14 inches dbh with secondary non-commercial treatments removing trees 8 inches dbh and less. Thinning from below would retain the largest trees in the stand. These treatments would reduce stand densities, minimizing the risk of mountain pine beetle outbreaks and stand replacement fire. Treatment aids in the maintenance of large trees by reducing their susceptibility to fire and insects while reducing competition for growing space and nutrients. Due to density reduction in the understory, stands would be more open accelerating the development of LOS ponderosa pine and the recruitment of large snags over the next 30+ years.

Prescribed Fire (Burn)

Primary and secondary treatments include burning and mowing. Mowing is designed to reduce shrub densities that contribute to ladder fuels and breakdown residual thinning slash. Similarly, burning is also designed to reduce shrub densities and thinning slash that contributes to ladder fuels; burning may risk losing existing large snags that provide nesting habitat. Burning operations could potentially provide additional snags for nesting habitat in the short-term. Prescribed Burn Only treatments would not be commercially thinned or mowed. There is no difference in effects to habitat as a result of either treatment since both treatments have the potential to recruit snags from burning operations providing

habitat in the short-term for Lewis' woodpecker. However, prescribed burning has the potential to remove large soft snags that provide suitable Lewis' woodpecker nesting habitat in the short-term.

See the DecAid snag and down wood analysis in the Wildlife Report for a summary of the dead wood habitat assessment.

Table 24 displays the total number of Lewis' woodpecker habitat by alternative and treatment type.

Table 24: Total Acres of Lewis' Woodpecker Habitat Associated by Treatment Type and Alternative

Treatment Type	Alternative 2	Alternative 3
HTH	13	13
B	96	96
Total Acres	**109**	**109**

Affects to Lewis' woodpecker habitat are similar under Alternatives 2 and 3. The outcome or long-term benefits to habitat as a result of the effects of each treatment type is also similar across the action alternatives.

Alternatives 2 and 3 similarly address the risk of insect, disease, and stand replacement fire by burning and mowing to maintain existing open ponderosa pine stands that need minimal thinning. Both alternatives would promote Lewis' woodpecker habitat by using prescribed fire to create individual fire killed trees which woodpeckers prefer for nesting, while maintaining habitat continuity across the project area, and promoting the development of future fire resistant stands of LOS ponderosa pine containing future nesting habitat. Although treatments would enhance habitat, not every fire killed trees greater than 17 inches dbh (minimum snag diameter for Lewis woodpecker) would provide suitable nesting habitat. Habitat is highly dependent on the spatial arrangement of suitable snags for nesting and their proximity to open areas that the Lewis' woodpecker needs for foraging. Treatments prescribed under both alternatives would promote spatial heterogeneity retaining the largest trees in the stands by providing a mosaic of tree densities. Residual trees would contain a variety of size classes providing residual foraging habitat as well as maintaining late and old structure to provide nesting habitat where it exists.

Overall, approximately 109 acres of Lewis' woodpecker reproductive habitat are associated with treatments identified under Alternatives 2 and 3. Treatments would not target the removal of large trees or snags and therefore would not impact habitat in the short-term. Burning associated with treatments could potentially recruit some large snags providing nesting habitat in the long-term as snags decay. Loss of snags in ponderosa pine habitat during prescribed fire treatments in Arizona and California ranged from 20% (Randall-Parker and Miller 2002), 45% (Horton and Mannan 1988), and 56% (Bagne et al. 2008). All three studies found that larger diameter ponderosa pine trees were least likely to die, at least in the short-term. Horton and Mannan (1988) found a 20-fold increase in abundance of snags < 15 cm dbh. Several studies showed that the highest snag losses were in areas where a long period of fire exclusion had occurred (Bagne et al. 1988, Holden et al. 2006). Bagne et al. (2008) and Horton and Mannan (1988) found that re-entry burns had a much lower mortality rate for snags, presumably because the trees that did not burn during the first entry were more resilient. Loss of snags

from prescribed fire was partially mitigated by the creation of new snags (Horton and Mannan 1988, Bagne et al. 2008).

Similar outcomes are expected with the Melvin Butte project. The majority of these stands have not been burned for decades and this would be the first entry with prescribed fire. The goal of the project is to promote and enhance LOS ponderosa pine habitat within stands identified as Lewis' woodpecker habitat. However, only approximately 2% of the project area is associated with Lewis woodpecker habitat treatments.

Cumulative Impacts —Alternatives 2 and 3

Activities identified in Table 5 (Cumulative effect table for wildlife) were reviewed to assess whether in combination with the likely impacts of the Melvin Butte project, there would be any cumulative impacts to Lewis' woodpecker reproductive habitat. The Deep Canyon and Whychus Watersheds is used as the scale for analysis for this species. The potential cumulative impacts are discussed below.

The Pole Creek Fire and the Two Bulls Fire Timber Salvage Projects and associated danger tree removal are ongoing within the Deep Canyon and Whychus watersheds. The Pole Creek Fire Timber Salvage is approximately 54 acres of ongoing fire salvage. Treatments were designed to retain 6 snags per acre that would provide the most suitable habitat for woodpeckers. Approximately 250 acres are proposed for salvage within stand replacement fire areas of the Two Bulls Fire, retaining 3 snags per acre as well as all snags greater than 21 inches in diameter to provide habitat for woodpeckers.

The Ursus Hazardous Fuels Reduction, the Bend Municipal Watershed Hazardous Fuels Reduction, and the Bear Wallow Firewood Projects focus primarily on removing dead and live lodgepole pine, as well as white-fir among green stands to reduce fuel loadings. There are approximately 6,810 acres associated with these projects; neither of these projects propose to reduce habitat elements associated with Lewis woodpecker habitat.

Approximately 10,622 acres of Lewis' woodpecker reproductive habitat exists within the Deep Canyon and Whychus watersheds. Alternatives 2 and 3 would treat approximately 109 acres of suitable reproductive habitat.

Although treatments would not reduce suitable nest trees, treatments are proposed within 1% of the total Lewis' woodpecker habitat within the Deep Canyon and Whychus watersheds; habitat for this species would be retained within the 109 acres associated the Melvin Butte project. Habitat quality and utility would be enhanced for this species by promoting the development of large soft snags that are highly suitable for nesting; create open stands that allow birds a clear view of avian predators from nest sites; and open up stands to allow birds to more effectively forage on the wing. With the ongoing forest management projects within the Deep Canyon and Whychus watersheds there would be less than a 1% reduction in the overall habitat for the Lewis" woodpecker across the Deschutes National Forest.

Determination

Cumulatively, with the ongoing forest management projects within the Deep Canyon and Whychus Watersheds, this project impacts less than 1% of suitable habitat across the Forest, the overall direct, indirect and cumulative effects would result in a small negative trend of habitat. The impacts to habitat

would be minimal at the Forest scale. The Melvin Butte Project is consistent with the Forest Plan, and thus continued viability of the Lewis' woodpecker is expected on the Deschutes National Forest.

Based on these assumptions, the Melvin Butte project ***May impact individuals or habitat, but would not likely contribute to a trend toward federal listing for the Lewis' woodpecker*.**

Landbird Conservation Strategy Consistency
Biological objectives are all based on "where ecologically appropriate" meaning actions must occur within the proper habitat addressed in order to be consistent or not.

Species	Biological Objectives	Consistent Yes, No, or NA	Rationale
Lewis' Woodpecker **In Ponderosa Pine Stands:**	Through natural events or management, maintain >1% of landscape as post-fire old ponderosa pine forest habitat	NA	There are no treatments associated with post fire ponderosa pine habitats
	Through natural events or management, maintain >50% of the post-fire landscape as unsalvaged	NA	There are no post-fire salvage treatments associated with the project.
	Where salvage is occurring in post-fire old ponderosa pine forest, (in burns >100 acres) salvage <50% of the standing and down dead	NA	This is not a salvage logging project.
	Where salvage is occurring in post-fire old ponderosa pine forest, (in all burns) retain all trees/snags >20"dbh and >50% of those 12-20" dbh	NA	This is not a salvage logging project.
Lewis' Woodpecker **In Ponderosa Pine Stands**	In all burns, snags should be clumped and hard and soft decay classes left to lengthen period of suitable habitat	NA	Project does not propose to remove snags in Lewis woodpecker habitat.
	In old forest habitat, provide 24 snags/acre >9"dbh and of these 6 snags/acre should be >20"dbh	Not Applicable	No snags will be removed in old forest ponderosa pine habitat.
	In old forest habitat, provide recruitment snags especially in areas of high risk stand replacement fire	Meets	In old forest ponderosa pine habitat, all residual green old growth will be retained
	In old forest habitat, provide shrub understory of >13% cover	Meets	Wildlife retention will occur with this habitat type that will remain untreated.

White-headed Woodpecker

Existing Condition

White-headed woodpeckers are uncommon permanent residents in forests east of the Cascades. They use habitat with large open ponderosa pine, low shrub levels and large snags. Dixon (1995) found white-headed woodpecker densities increased with increasing old-growth ponderosa pine trees and showed a positive association with large ponderosa pine. The white-headed woodpecker is a primary cavity excavator of soft snags. This woodpecker is the only woodpecker species to rely heavily on seeds of ponderosa pine for food (Marshall et al. 2003 p. 364).

White-headed woodpeckers may require dynamic landscapes with both burned and unburned habitat for the long-term persistence of populations (Hollenbeck et al. 2010). Wightman et al. (2010) studied existing open-canopied ponderosa pine forests before a fire and a mosaic of burn severities within 1 kilometer of nests to characterize nest sites on the Fremont-Winema NF. They found the presence of larger, more decayed snags and fewer live trees near a snag (within 1 hectare) after fire were important factors for nest selection; however this didn't influence nest survival. Open-canopied pine forests with mature, cone-producing trees within proximity of burns were also important in identifying white-headed woodpecker habitat as long as most of the landscape was not subjected to stand replacement fires (Wightman et al. 2010). A mosaic of burn severities across the landscape may improve white-headed woodpecker habitat by opening forest canopies in higher severity burned areas while retaining decayed snags created before wildfire and live cone-producing trees in unburned or low severity burned areas (Wightman et al. 2010).

A long term study on the white-headed woodpecker occurred on the Deschutes and Winema National Forests from 1997-2004 with several Deschutes study sites occurring in the Metolius Basin area. Frenzel (2000) calculated the mean diameter for white-headed woodpecker nest trees to be 26.2"dbh while Dixon (1995) found similar results (mean diameter of 25.6"dbh). Frenzel (2003) found nests at sites with a high density of large diameter trees had a higher survival rate than nests in recently harvested sites. Unharvested sites or sites with greater than 12 trees per acre >21"dbh had a success rate of 63.1% while nests at previously harvested sites or lower densities of large trees had a success rate of 39.8%. Therefore, white-headed woodpeckers were positively associated with higher densities of large trees. On the Winema National Forest, white-headed woodpeckers were found to be using small-diameter trees, logs in a slash pile and upturned roots (6-13"dbh) where large snags were uncommon (Frenzel 2002).

White-headed woodpeckers roost in ponderosa pine habitats with an average canopy closure of 57.4 + 1.9% canopy closure (Dixon 1995). In addition, most (65%) roost sites were located on flat ground and found on the lower one-third of the slope or bottom slope (89%) with slopes ranging from 0-40% and an average of 7 + 1% (Dixon 1995). Roost site elevations ranged from 2900-4311 feet with an average elevation of 3382 + 39 feet (Dixon 1995).

Snags and live trees used for roosts were greater than snags and live trees found within plots (Dixon 1995). Roost trees diameters averaged 24 + 1" dbh and ranged from 7 to 45" dbh while heights ranged from 6 to 164 feet and averaged 66 + 3 feet tall (Dixon 1995). Tree diameter at cavity height ranged from 2 to 30" in diameter and averaged 17 + 2" dbh while cavity heights averaged 8.6 + 1 feet tall and ranged from 5.5 to 20 feet (Dixon 1995).

Dixon (1995) found white-headed woodpeckers did not use the same kind of tree for nesting as they did for roosting. Nest trees were typically dead, had broken tops, were shorter in height, contained more cavities, and had a higher percentage of bark present than roost trees. She also found they used different decay stages for nesting than roosting. Table 25 provides a comparison of decay classes used for nesting and roosting found by Dixon (1995).

Table 25. Nest and Roost Tree Decay Class Comparison for White-headed Woodpecker (Dixon 1995).

Decay Class	Nest Tree Percentage	Roost Tree Percentage
Decay Class 1 (Recently Dead)	25%	11%
Decay Classes 2-3 (Moderately Decayed)	51%	34%
Decay Classes 4-5 (Advanced Decay)	25%	55%

Foraging habitat is usually found in association with nesting habitat. Kozma (2011) surmised because white-headed woodpeckers are primarily bark gleaners and feed on ponderosa pine seeds throughout the winter, large diameter and old-growth ponderosa pine may be more important to white-headed woodpeckers because these trees have a greater bark foraging area, higher insect abundance, and greater and more frequent cone production than smaller trees.

Dixon (1995) found 42% of over 2,000 foraging observations were on branches, 23% on the upper trunk, 22% on the mid-trunk, and 13% on the lower trunk with an average foraging height of 62 feet on large diameter live ponderosa pine trees. Dixon (1995) also showed that white-headed woodpeckers gleaned 35%, fed on cones 31%, pecked 24%, and fed on sap 7% with males foraging slightly higher in trees and feeding on cones more than females.

White-headed woodpeckers feed on tree sap (Dixon 1995, Kozma 2010) as well as insects and seeds. White-headed woodpeckers are weak excavators and this may explain the use of smaller trees for sap feeding. It may be easier for them to drill wells in thinner bark of smaller ponderosa pine compared to thicker, furrowed bark of larger pine (Kozma 2011). Table 26 provides a comparison of sap and non-used tree for the white-headed woodpecker.

Table 26. Comparison of Sap and Non-used Trees for White-headed Woodpecker (Kozma 2010).

Trees	Mean Height (feet)	Height Range (feet)	Mean Diameter (dbh inches)	Diameter Range (dbh inches)
Sap Trees	44	44.6 – 72.5	8.8	2.4 – 14.6
Non-used Trees	54	9.1 – 96.4	12.2	2.0 – 23.3

Threats to this species include increased stand densities in ponderosa pine due to fire suppression, loss of large, old ponderosa pine trees and snags, wildfire, and increased shrub densities. Increased shrub densities may be factors leading to increased mammalian nest predation and increased risk of avian predation on adults (Frenzel 2000).

White-headed woodpecker nest monitoring occurred from 2003 to 2011 in similar treatment types associated with the Metolius Basin project (DNF 2011) as are prescribed in the Melvin Butte project. The monitoring found that resident birds were not displaced by short-term impacts associated with the

implementation of treatments resulting in nests that were successful. In addition, due to stand density reductions, nests were more successful due to the increase in suitable habitat.

The NatureServe status for the white-headed woodpecker is apparently secure at the global and national levels (G4 and N4) and imperiled at the state level (S2).

Through the Forest wide assessment completed for MIS, white-headed woodpecker reproductive habitat was mapped across the entire Deschutes National Forest. Habitat assessed for the white-headed woodpecker is associated with both green stands and post fire habitats. Habitat for the white-headed woodpecker occurs sparingly throughout the Deschutes National Forest in the following plant associations –ponderosa pine, Douglas-fir, white fir, and Shasta red fir in open stands where average tree size is 20"dbh or greater. Approximately 316 acres of habitat currently exists within the Melvin Butte project area. Approximately 21,025 acres of habitat occurs within the Deep Canyon Whychus Watersheds and approximately 198,330 acres of habitat across the Deschutes National Forest. (Table 27).

Table 27. White-headed Woodpecker Reproductive Habitat within the Melvin Butte Project Area, Deep Canyon and Whychus Watersheds, and Across the Deschutes National Forest.

Acres of White-headed Woodpecker Habitat in the Melvin Butte project area	**Acres of White-headed Woodpecker Habitat in the Deep Canyon and Whychus Watersheds**	**Acres of White-headed Woodpecker Habitat Across the Deschutes National Forest**
316 acres	21,025 acres	198,330 acres

For the detailed assessment on the white-headed woodpecker for the Deschutes National Forest, see the Forest-wide Species Assessment (USFS 2012).

There have been four documented observations of white-headed woodpeckers from 1999 to 2002 in the project area. During the 2010 field season, two nest sites were located in the Melvin Butte project area as a result of nest survey conducted during the 2010 Hollenbeck et al. white-headed woodpecker research project that occurred on the Sisters Ranger District.

Measure: White-headed woodpecker habitat change in quality due to thinning and prescribed burning operations.

Environmental Consequences

Alternative 1 – No Action (Ecological Trend)

Stand resilience to insects and disease is measured by the Upper Management Zone (UMZ). The UMZ relates to the density of trees (basal area, trees per acre, etc.) a forest stand can support without significant mortality from bark beetles. The upper management zone is the density level at which trees begin to come under significant stress and can become susceptible to bark beetles and other insects and diseases. Forest stands managed below the upper management zone are more resilient. UMZ can also be used to estimate which stands are more susceptible to stand replacing fire by identifying those stands that are above the Upper Management Zone. Approximately 4,456 acres that have the potential to receive vegetation treatment. Under the No Action, alternative 92% of these stands are above the

Upper Management Zone and are at risk or could currently be impact by insects and disease due to high stand densities. Under the No Action Alternative, no treatments would occur within Melvin Butte project area. However, the "ecological trend" in the short-term stands would continue to remain suppressed and at risk of a stand-replacement wildfire.

Due to stand densities and increases in mortality the risk of large scale stand replacement fire across the project area increases overtime, potentially impacting high density stands. In the short-term, fire events could provide some nesting and foraging habitat but the majority of the areas would not. Since these stands are predominantly 60-80 year old second growth ponderosa pine, snags recruited from the fire would be small with an average diameter of 14 inches. Since the majority of burned trees would of small diameters most of the fire killed trees would fall in the first 10 years and many areas would be void of nesting habitat in the long-term. If nesting habitat existed it would be limited on the landscape.

Currently, high stand densities would result in a decrease in tree vigor among all size classes. The most significant effect of high stand densities would be the gradual loss of the existing historic large-tree component/nesting habitat which is likely to occur at a much higher rate than if stand densities were reduced to more sustainable level.

Areas that currently provide suitable white-headed woodpecker habitat would persist in the short-term since this species prefers open ponderosa pine stands. Without treatments such as prescribed fire and thinning from below in multi-storied ponderosa pine and mixed conifer stands, stand densities would reduce the longevity of residual old growth and large tree structure that occurs in these stands. In the long-term, available nest trees would be limited and the future development of larger nesting trees would be prolonged. In high density stands of second growth ponderosa pine containing mistletoe, in the short-term mistletoe would reduce the resiliency of these stands against bark beetle attack. In the long-term, the second growth stands would likely contain bark beetle outbreaks and high densities of small snags. Therefore there would be a lack of recruitment of large tree structure over time, limiting suitable nesting habitat for the white-headed woodpecker.

Alternative 2 and 3- Direct and Indirect Effects

There are 316 acres of suitable habitat in residual stands of late and old structure ponderosa pine at mid elevation in the northern portion of project area. Most of the ponderosa pine stands within the project area typically are unsuitable because densely stocked second growth "black bark" stands lack soft snags which provide nesting habitat.

Thinning From Below (HTH)

Thinning in suitable reproductive habitat would occur in both second growth ponderosa pine and multi-storied ponderosa pine and mixed conifer stands. Thinning (from 8" dbh and up) from below would favor the largest ponderosa pine in pure pine stands. In mixed conifer stands, thinning would favor ponderosa pine and healthy white-fir. A basal area of 40 – 120 square feet would remain on average in each stand. Treatment would maintain large trees by reducing their susceptibility to fire and insects by reducing competition for growing space and nutrients. Thinning decreases stand densities and allows for faster growth of residual trees while reducing risk of stand replacing fire (removal of ladder fuels). Due to density reduction in the understory, stands would be more open accelerating the development of LOS

ponderosa pine and recruit large snags that the white-headed woodpecker specifically select for nest sites over the long term.

Within mixed conifer stands, thinning would favor ponderosa pine focusing removal on smaller diameter white-fir and lodgepole pine. Favoring ponderosa pine would promote more fire resilient stands in the future, reducing the risk of insects and disease that are common to white-fir and lodgepole pine by reducing the abundance of these species in the stands. Although the treatments promote ponderosa pine, residual green white-fir and lodgepole pine would exist in these stands; however they are both short-lived species compared to ponderosa pine and typically recruited as snags at a higher rate due to their susceptibility to insects and disease. It is likely the lodgepole pine and white-fir more readily provide nesting habitat over the long-term as large ponderosa pine develop and are recruited as nesting habitat in the future.

Overall residual trees would retain a variety of seral classes providing foraging habitat as well as maintaining late and old structure to provide nesting habitat. Treatments would promote heterogeneity in these stands, retaining the largest trees and providing a mosaic of tree densities. Treatments would be beneficial to the white-headed woodpecker by opening stands adjacent to available nest sites and would allow for greater predator avoidance and promote higher nest success.

Prescribed Fire (Burn)

Secondary fuels treatments include mowing and burning to reduce shrub densities and residual thinning slash in the understory. Mowing would potentially reduce rodent populations, promoting the likelihood of nest success. Similarly, burning would also reduce rodent habitat, but would also recruit snags in the short-term providing potential nesting habitat. However, since white-headed woodpecker are weak excavators and dependent on soft snags for nesting, the utility of newly created snags would be limited until they decay to a point that is conducive to excavation. Within second growth black bark ponderosa pine stand that are 60 to 80 year second growth, snags recruited from prescribed burning would range between 14-20 inches dbh. Although these newly created snags are on the small end for nesting, snag densities are low in these stands and very few snags exist over 21 inches dbh. Currently use due to the lack of nest site availability these newly created small diameter snags may provide the only available nesting habitat in the short-term.

Non-commercial Thinning (P)

In addition, ponderosa pine plantations would be thinned that contain individual large diameter ponderosa pine trees that provide some foraging habitat for the white-head woodpecker. These plantations would be thinned to reduce inter-tree competition and accelerate individual tree development. White-headed woodpeckers primarily forage by gleaning insects from under the bark of large ponderosa pine but would also excavate sap wells in second growth or young ponderosa pine (Dixon 1995, Kozma 2010). These treatments would reduce some foraging habitat, but fully stocked stands would remain after treatment. Treatments are intended to reduce stocking density promoting the development of overstory stands and reduce the likelihood of losing these trees to bark beetle infestation. Treatment would retain residual foraging opportunities.

Scenic Views Enhancement

Habitat associated with this treatment type occurs in the mixed conifer and lodgepole pine plant association group (the majority of habitat is associated with lodgepole pine). This treatment occurs in

stands along the Forest Road 16 corridor that were burned in the 2012 Pole Creek fire. Treatments would focus on the removal of dense stands of dead lodgepole pine to reduce dead wood densities that create a fuel hazard in the future. Ponderosa pine is limited in this area and exists primarily as individual trees. This area provides both nesting and foraging options due to its post fire habitat. Where large dead ponderosa pine exists they would be retained for wildlife habitat. No green trees of any species would be removed within this treatment area. Treatments would remove small dead trees from the vicinity of large dead ponderosa pine. The treatment would primarily focus on the removal of trees that are small in size and do not provide nesting utility of the white-headed woodpecker and therefore would not remove habitat.

See DecAid snag and down wood analysis in the Wildlife Report for a summary of the dead wood habitat assessment.

Table 28 provides a summary of the total treatment acres associated with to suitable white-headed woodpecker habitat by alternative.

Table 28: Total Acres of Reproductive Habitat Associated with Each Treatment Type by Alternative for the Melvin Butte Project Area

Treatment Type	Alternative 2	Alternative 3
B	83	83
HTH	29	34
P	151	151
Scenic Views Enhancement	39	39
Total Acres.	**302**	**302**

Affects to white-headed woodpecker habitat are similar under Alternatives 2 and 3. The outcome or long-term benefits to habit as a result of the effects of each treatment type is also similar across both action alternatives.

Alternatives 2 and 3 similarly address the risk of insects, disease, and stand replacement fire, as well as promote stand level heterogeneity. Both alternatives promote habitat diversity due to the variety of stand densities stands that would be thinned with the objective of promoting habitat for a variety of species associated with ponderosa pine and mixed conifer dry plant association groups. Both alternatives create a landscape mosaic of thinned and un-thinned habitats, maintaining habitat continuity across the project area, while promoting the development of future fire resistant stands of LOS ponderosa pine. Residual trees would retain a variety of seral classes providing residual foraging habitat as well as maintaining late and old structure to provide nesting habitat where it exists.

To assist with promoting diversity and variability on the landscape within the ponderosa pine and mixed conifer dry plant association groups, approximately 33 % of the project area would be left untreated. Residual untreated areas would be left as entire stands with an occasional small aggregate patch. Overall approximately 302 acres of white-headed woodpecker reproductive habitat are associated with treatments identified under Alternatives 2 and 3.

Cumulative Effects—Alternatives 2 and 3

Activities identified in Tables xx (wildlife cumulative effects table) were reviewed to assess whether, in combination with the likely impacts of the Melvin Butte project, there would be any cumulative impacts to white-headed woodpecker habitat which is associated with ponderosa pine and mixed conifer stands containing late and old structure ponderosa pine. These activities were reviewed across the Deep Canyon and Whychus Watersheds to determine cumulative impact to the white-headed woodpecker.

The Pole Creek Fire and Two Bulls Fire Timber Salvage Projects and associated danger tree removal are ongoing within the Deep Canyon and Whychus watersheds. The Pole Creek Fire Timber Salvage is associated with approximately 54 acres of ongoing stand replacement fire areas being salvage logged. Treatments were designed to provide woodpecker habitat by retaining 6 snags per acre to provide the most suitable habitat for the woodpeckers. Approximately 250 acres are proposed for salvage within stand replacement areas associated with the Two Bulls Fire, retaining 3 snags per acre as well as all snags greater than 21 inches in diameter to provide habitat for woodpeckers.

The Ursus Hazardous Fuels Reduction, the Bend Municipal Watershed Fuels Reduction, and the Bear Wallow Firewood Projects are primarily associated with montane mixed conifer habitat and lodgepole pine; these project total approximately 6,810 acres. These projects are not likely associated with white-headed woodpecker habitat and therefore would not likely contribute to cumulative effects.

The Three Creeks Personal Use Firewood Cutting Area also occurs in the watersheds. This area occurs in both Eastside Mixed Conifer and lodgepole pine habitat types. Firewood cutting is not wide spread and primarily occurs where dead trees can be accessed from open roads. Although snags are cut and removed, removal occurs on an individual tree basis versus across the entire designated area. The area is approximately 3,029 acres. The majority of firewood removed is associated with beetle killed lodgepole pine; impacts to white-headed woodpecker would be incidental from firewood gathering.

The thinning and burning identified with Alternatives 2 and 3 are associated with approximately 302 acres or <1% of the total habitat within the Deep Canyon and Whychus watersheds. Habitat quality for white-headed woodpecker would remain throughout the Melvin Butte project area.

White-headed woodpecker habitat is predicted to increase as treatments are focused on ponderosa pine restoration to develop open grown forests with frequent underburned fires, creating sustainable white-headed woodpecker habitat over the long term.

Determination

Cumulatively, with the ongoing forest management projects within the Deep Canyon and Whychus Watersheds, this project impacts less than 1% of suitable habitat across the Forest; the overall direct, indirect and cumulative effects would result in a small negative trend of habitat. The loss of habitat would be insignificant at the Forest scale. The Melvin Butte Project is consistent with the Forest Plan and thus continued viability of the white-headed woodpecker is expected on the Deschutes National Forest.

Based on these assumptions, the Melvin Butte project ***May impact individuals or habitat, but would not likely contribute to a trend toward federal listing for the white-headed woodpecker*.**

Landbird Conservation Strategy Consistency

Biological objectives are based on "where ecologically appropriate" meaning actions must occur within the proper habitat addressed in order to be consistent or not.

Species	Biological Objectives	Consistent Yes, No, or NA	Rationale
White-headed Woodpecker **In Ponderosa Pine Stands:**	Provide a mean of 10 trees/acre >21"dbh and at least 2 trees >31"dbh	Meets	Within suitable white-headed woodpecker habitat, residual stand densities will exceed biological objectives
	Provide a mean of 1.4 snags/acre >8"dbh with 50% >25"dbh in a moderate to advanced state of decay	Meets	The project does not propose to remove snag in ponderosa pine stands.
	Provide a mean canopy closure of 10-40%	Meets	Mean residual canopy closure within suitable white-headed woodpecker habitat will be 30%.
	In predominantly old-growth, provide >350 acres of contiguous habitat	Not Applicable	All old growth habitat will be retained.
	In 26-75% old-growth, provide >700 acres of contiguous habitat	Not Applicable	All old growth habitat will be retained.

Johnson's hairstreak

Existing Condition

This small, three-quarter inch uncommon butterfly ranges from southern British Columbia, south through eastern and western Washington, and western Oregon, to central and south California. Isolated populations exist in northeastern Oregon to central Idaho. In Oregon, it has been found sparsely in the Cascades, Coast Range, Siskiyou Mountains, Blue Mountains and Wallowa Mountains (Pyle 2002). Elevations range from sea level to 6,000 feet. Most of the 52 records for Oregon are above 2,000 feet (Hinchliff 1996). This butterfly species depends on coniferous forests that contain dwarf mistletoes (genus *Arceuthobium*) found in western hemlock, red fir, and Jeffrey pine (NatureServe 2012). Although these tree species found in the proposed project area, the area does contain mistltoe infected white fir, ponderosa pine, and lodgepole pine.

Measure: Acres of Dwarf Mistletoe Affected

Environmental Consequences

Alternative 1 – No Action (Ecological Trend)

The No Action Alternative would result in no immediate impact to Johnson's hairstreak because no vegetation management actions would occur to reduce mistletoe populations. Potentially suitable habitat would be maintained based on the widespread presence of mistletoe across the project area.

Direct and Indirect Impacts—Alternatives 2 and 3

Alternative 2 would result in the specific reduction of infected mistletoe trees on about 160 acres. On average, about 97% of the project area would contain varying levels of mistletoe post treatment. This retention, plus leaving about 906 acres in untreated stands and not removing all mistletoe trees (only trees with the highest damage ratings would be removed), would provide Johnson's hairstreak habitat widely distributed across the entire project area.

Alternative 3 removes less mistletoe than Alternative 2. Alternative 3 does not propose specific mistletoe treatments; thinning would occur with the objective of reducing stand densities by thinning from below. Alternative 3 would retain more trees with mistletoe and would have a lower potential to remove Johnson's hairstreak habitat.

Cumulative Impacts—Alternatives 2 and 3

For this species cumulative effects were bounded by the Deep Canyon watersheds based on the limited scale of the proposed actions in relation to the size of the watersheds and availability of habitat outside of timber harvest areas and mechanized use (e.g. wilderness and roadless areas). Past actions have been considered in the existing condition of habitat and the cumulative effects ongoing and reasonably foreseeable actions were analyzed.

The Bend Municipal Watershed Fuels Reduction and the Bear Wallow Fire Wood Projects are primarily associated with montane mixed conifer habitat and lodgepole pine totaling approximately 910 acres. These project both primarily occur within 150 feet of open roads. These projects are not likely associated with Johnson's hairstreak habitat and primarily propose to remove beetle killed lodgepole pine; therefore the projects would not likely contribute to cumulative effects.

The Three Creeks Personal Use Firewood Cutting Area also occurs in the watersheds. This area occurs in both Eastside Mixed Conifer and lodgepole pine habitat types. Firewood cutting is not wide spread and primarily occurs where dead trees can be accessed from open roads. The area is approximately 3,029 acres. The majority of firewood removed is associated with beetle killed lodgepole pine; the proposed action under Melvin Butte would not have additive impacts associated with personal use firewood cutting.

The Ursus project has the potential to impact Johnson hairstreak habitat. On average about 31%-32% of the project area (and depending upon the alternative chosen) would remain unchanged, plus a majority of the Tumalo Creek and Deep Canyon watersheds would be retained in the roadless and wilderness areas retaining the presence of mistletoe throughout the watersheds. It is assumed species presence would still be maintained with either of these alternatives.

Determination

Alternative 2 would have the greatest potential to impact Johnson hairstreak because of the direct treatment of mistletoe on 160 acres. Alternative 3 would have the least impact but would thin stands

throughout regardless of mistletoe; incidental removal would still occur under Alternative 3. Although both alternatives would remove mistletoe, Alternative 3 would retain a higher density of mistletoe since it would not intensively treat areas that are the most heavily infected. On average about 97% of the stands would still contain mistletoe post treatment. Mistletoe at various levels would continue to occupy the majority of the project area providing habitat for the Johnson's hairstreak. Under both alternatives the project proposes to remove those with the highest damage ratings to reduce the rate of spread. The majority of the Deep Canyon watershed would remain untreated in inventoried roadless and Wilderness areas insuring the presence of mistletoe throughout the watershed. It is assumed species presence would be maintained with either of these action alternatives. Based on these assumptions, the Melvin Butte Project ***May impact individuals or habitat, but would not likely contribute to a trend toward federal listing for the Johnson's hairstreak*****.**

Appendix 1. LITERATURE CITED

Abele, S.C., V.A. Saab, and E.O. Garton. (2004, June 29). Lewis's Woodpecker (*Melanerpes lewis*): a technical conservation assessment. [Online]. USDA Forest Service, Rocky Mountain Region. Available: http://www.fs.fed.us/r2/projects/scp/assessments/lewisswoodpecker.pdf

Altman, B. 2000. Conservation Strategy for Landbirds of the East-Slope of the Cascade Mountains in Oregon and Washington. Version 1.0. Oregon-Washington Partners in Flight. 81 pp.

Anthony, R.G., E.D. Forsman, A.B. Franklin, D.R. Anderson, K.P. Burnham, G.C. White, C.J. Schwartz, J. Nichols, J.E. Hines, G.S. Olson, S.H. Ackers, S. Andrews, B.L. Biswell, P.C. Carlson, L.V. Diller, K.M. Dugger,

K.E. Fehring, T.L. Fleming, R.P. Gerhardt, S.A. Gremel, R.J. Gutierrez, P.J. Happe, D.R. Herter, J.M. Higley, R.B. Horn, L.L. Irwin, P.J. Loschl, J.A. Reid, and S.G. Sovern. 2006. Status and trends in demography of northern spotted owls, 1985-2003. Wildlife Monograph No. 163.

Aubry, K.B., M.J. Crites, and S.D. West. 1991. Regional patterns of small mammal abundance and community composition in Oregon and Washington. Pages 284-294 in PNW-GTR-285, Pacific Northwest Research Station, USDA Forest Service, Olympia, WA.

Buchanan, J.B. 2004. Managing habitat for dispersing northern spotted owl – are the current management strategies adequate? Wildlife Society Bulletin32:1333-1345.

Carey, A.B. 1995. Sciurids in Pacific Northwest managed and old-growth forests. Ecological Applications 5(3):648-661.

Carey, A.B. 2000. Effects of new forest management strategies on squirrel populations. Ecological Applications 10(1):248-257.

Carey, Andrew B., Todd M. Wilson, Christine C. Maguire, and Brian L. Biswell. 1997. Dens of Northern Flying Squirrels in the Pacific Northwest. J. Wildl. Manage. 61(3):684-699.

Carey, A.B., W. Colgan III, J.M. Trappe, and R. Molina. 2002. Effects of forest management on truffle abundance and squirrel diets. Northwest Science, 76(2):148-157.

Courtney, S.P., J.A. Blakesley, R.E. Bigley, M.L. Cody, J.P. Dumbacher, R.C. Fleischer, A.B. Franklin, R.J. Gutierrez, J.M. Marzluff, and L. Sztukowski. 2004. Scientific evaluation of the status of the northern spotted owl. Sustainable Ecosystems Institute, Portland, OR.

Courtney, S. P., Andy B. Carey, Martin L. Cody, Kate Engel, Katie, E. Fehring, Jerry F. Franklin, Mark R. Fuller, Rocky Guiterrez, John F. Lehmkuhl, Miles A. Hemstrom, Paul F. Hessburg, Scott L. Stephens, Lisa A. Szutkowski, and Lenny Young. 2008. Scientific Review of the Draft Northern Spotted Owl Recovery Plan and Reviewer Comments. Sustainable Ecosystems Institute. Portland, Oregon.

Crozier, M.L., M.E. Seamans, R.J. Gutierrez, P.J. Loschl, R.B. Horn, S.G. Sovern, and E.D. Forsman, 2006. Does the presence of Barred Owls suppress the calling behavior of Spotted Owls? Condor 108: 760-769.

Csuti, B.A., A.J. Kimerling, T.A. O'Neil, M.M. Shaughnessy, E.P. Gaines, and M.M. Huso. 1997. Atlas of Oregon Wildlife: Distribution, Habitat, and Natural History. Oregon State University Press, Corvallis, OR. 492 pp.

Dahms, W.G. 1949. How long do ponderosa pine snags stand? Research Notes, No. 57. Pacific Northwest Forest and Range Experiment Station. Deschutes Branch.

Dobkins et. 1995. Springtime movements, and foraging activity of Townsend's big-earedbat (Plecotus townsendii) in central Oregon. The Great Basin Naturalist.

Dixon, R.D. 1995. Density, nest-site and roost-site characteristics, home range, habitat use, and behavior of white-headed woodpeckers: Deschutes and Winema National Forests, Oregon. Non-game Project #93-3-01, Oregon Department of Fish and Wildlife.

Everett, R., J. Lehmkuhl, R. Schellhaas, P. Ohlson, D. Keenum, H. Riesterer, and D. Spurbeck. 1999. Snag dynamics in a chronosequence of 26 wildfires on the east slope of the Cascade Range in Washington state, USA. International Journal of Wildland Fire 9(4): 223-234.

Federal Register. 2008. Vol. 73, No. 157/August 13, 2008 Announcement of a Revised Designation of Critical Habitat for the Northern Spotted Owl.

Forest Service Manual 2600, Wildlife, Fish, and Sensitive Plant Habitat Management. Available online: http://www.fs.fed.us/cgi-bin/Directives/get_dirs/fsm?2600

Forristal, C. and V. Saab (unpublished data). White-headed Woodpeckers Monitoring from the Toolbox Fire Salvage. Data was acquired from Kim Mellen.

Forsman, Eric D., Robert G. Anthony, E. Charles Meslow, and Cynthia J. Zabel. 2006. Diets and Foraging Behavior of Northern Spotted Owls in Oregon. J. Raptor Research. 38(3):214-230.

Frenzel, R.W. 2000. Nest-sites, nesting success, and turnover rates of white-headed woodpeckers on the Deschutes and Winema National Forests, Oregon in 2000. 63 pp.

Frenzel, R.W. 2002. Nest-sites, nesting success, and turnover rates of white-headed woodpeckers on the Deschutes and Winema National Forests, Oregon in 2002. 56 pp.

Frenzel, R.W. 2003. Nest-sites, nesting success, and turnover rates of white-headed woodpeckers on the Deschutes and Winema National Forests, Oregon in 2003. 49 pp.

Frenzel 2004 – White-headed Woodpecker Data specific to Deschutes – Sisters RD. Data was acquired from Kim Mellen.

Gremel, S. 2005. Factors controlling distribution and demography of northern spotted owls in a reserved landscape. Thesis, University of Washington, Seattle.

Hamer, T.E., E.D. Forsman, and E. M. Glenn. 2007. Home range attributes and habitat selection of barred owls in an area of sympatry. Condor:109:750-768.

Herter, D.R. and L.L. Hicks. 2000. Barred owl and spotted owl populations and habitat in the central Cascade Range of Washington. Journal of Raptor Research 34:279-286.

Keen, F.P. 1929. How soon do yellow pine snags fall? Journal of Forestry 27:735-737.

Kunz, T.H. and R.A. Martin. 1982. Plecotus townsedii. Mammallian Species No. 175. The American Society of Mammalogists. [Online version available at http://www.science.smith.edu/departments/Biology/VHAYSSEN/msi/pdf/i0076-3519-174-01-0001.pdf]

Laudenslayer, W.F. 2002. Cavity-nesting bird use of snags in eastside pine forests of northeastern California. Pacific Southwest Research Station, Fresno, California. USDA Forest Service Gen. Tech. Rep. PSW-GTR-181.

Lehmkuhl, J.F., P.F. Hessburg, R.L. Everett, M.H. Huff, and R.D. Ottmar. 1994. Historical and current forest landscapes of eastern Oregon and Washington. Part 1: Vegetation pattern and insect and disease hazard. Gen. Tech. Rep. PNW-GTR-328. USDA Forest Service. Pacific Northwest Research Station. Portland, OR.

Lehmkuhl, John F., Laura E. Gould, Efren Cazares, and David R. Hosford. 2004. Truffle abundance and mycophagy by northern flying squirrels in eastern Washington forests. Forest Ecology and Management 200 (2004) 49-65.

Lehmkuhl, John F., Keith D. Kistler, James S. Begley, and John Boulanger. 2006. Demography of Northern Flying Squirrels Informs Ecosystem Management of Western Interior Forests. Ecological Applications, 16(2), 2006, pp. 584-600.

Lehmkuhl, John F., Keith D. Kistler, and James S. Begley. 2006. Bushy-Tailed Woodrat Abundance in Dry Forests of Eastern Washington. Journal of Mammalogy 87(2): In Press.

Livezey, K.B. 2007. Barred Owl habitat and prey: a review and synthesis of the literature. Journal of Raptor Research 41:177-201.

Marshall, D.B., M.G. Hunter, and A.L. Contreras, Eds. 2003. Birds of Oregon: A General Reference. Oregon State University Press, Corvallis, OR. 768 pp.

Maser, Z., C. Maser, and J.M. Trappe. 1985. Food habits of the northern flying squirrel (*Glaucomys sabrinus*) in Oregon. Can. J. Zool. 63:1084-1088.

Mills, L.S. 1995. Edge effects and isolation: red-backed voles on forest remnants. Conservation Biology 9(2):395-403.

NatureServe. 2007. Nature Serve Explorer: An online encyclopedia of life [web application]. Version 1.8. NatureServe, Arlington, Virginia. Available http://www.natureserve.org/explorer. (Accessed: February 22, 2008).

Olson, G.S., R.G. Anthony, E.D. Forsman, Sl.H. Ackers, P.J. Loschl, J.A. Reid, K.M. Dugger, E.M. Glenn, and W.J. Ripple. 2005. Modeling of site occupancy dynamics for northern spotted owls, with emphasis on the effects of barred owls. Journal of Wildlife Management 69:918-932.

Pearson, R.R. and K.B. Livezey. 2003. Distribution, numbers, and site characteristics of spotted owls and barred owls in the Cascade Mountains of Washington. Journal of Raptor Research 37:265-276.

Ransome, D.B. and T.P. Sullivan. 2003. Population dynamics of *Glaucomys sabrinus* and *Tamiasciurus hudsonicus* in old-growth and second-growth stands of coastal coniferous forests. Can. J. For. Res. 33:587-596.

Rosenberg, D.K. and R.G. Anthony. 1992. Characteristics of northern flying squirrel populations in young second- and old-growth forests in western Oregon. Can. J. Zool. 70:161-166.

Rosenberg, D.K., K.A. Swindle, and R.G. Anthony. 1994. Habitat associations of California red-backed voles in young and old-growth in western Oregon. Northwest Science 68(4):266-272.

Rosentreter, R., G.D. Hayward, and M. Wicklow-Howard. 1997. Northern flying squirrel seasonal food habits in the interior conifer forests of central Idaho, USA. Northwest Science, 71(2):97-102.

Ruggerio, L.F., K.B. Aubry, S.W. Buskirk, L.J. Lyon, and W.J. Zielinski, tech eds. 1994. The Scientific Basis for Conserving Carnivores: American Marten, Fisher, Lynx and Wolverine in the Western United States.

Saab, V.A., R. Brannon, J. Dudley, L. Donohoo, D. Vanderzanden, V. Johnson, and H. Lachowski. 2002. Selection of fire-created snags at two spatial scales by cavity-nesting birds. Gen. Tech. Rep. PSW-GTR-181. Pacific Southwest Research Station, USDA Forest Service. 14 pp.

Saab, V.A., J. Dudley, and W.L. Thompson. 2004. Factors influencing occupancy of nest cavities in recently burned forests. Condor 106:20-36.

Saab, V.A., R.E. Russell and J.G. Dudley. 2007. Nesting densities of cavity-nesting birds in relation to post-fire salvage logging and time since wildfire. *Condor* 109:97-108.

Sallabanks, R., B.G. Marcot, R.A. Riggs, C.A. Mehl, and E.B. Arnett. 2001. Wildlife of eastside (interior) forests and woodlands. Pp. 213-238 in: D. H. Johnson and T. A. O'Neil, ed. Wildlife-habitat relationships in Oregon and Washington. Oregon State University Press, Corvallis OR. http://www.nwhi.org/nhi/whrow/chapter8cwb.pdf

Simpson, M.A. 2007. Forested Plant Associations of the Oregon East Cascades. U.S. Dept. of Ag, Pacific Northwest Region Tech. Paper R6-NR-ECOL-TP-03-2007. Portland, OR.

Singleton, P.H., J.F. Lehmkuhl, W.L. Gaines, and S.A. Graham. 2010. Barred owl space use and habitat selection in the eastern Cascades, Washington. Journal of Wildlife Management 74:285-294.

Sisters Ranger District Project Surveys and Wildlife Sightings Records.

Smith, F.A. 1997. Neotoma cinerea. Mammalian Species 564:1-8.

Tallmon, D. and L.S. Mills. 1994. Use of logs within home ranges of California red-backed voles on a remnant of forest. Journal of Mammalogy 75(1):97-101.

Thomas, J.W., E.D. Forsman, J.B. Lint, E.C. Meslow, B.R. Noon, and J. Verner. 1990. A conservation strategy for the northern spotted owl. Interagency Scientific Committee to Address the Conservation of the Northern Spotted Owl.

U.S. Forest Service, U.S. Bureau of Land Management, U.S. Fish and Wildlife Service, and U.S. National Park Service, Portland, Oregon.

Thysell, D.R., L.J. Villa, and A.B. Carey. 1997. Observations of northern flying squirrel feeding behavior: use of non-truffle food items. Northwestern Naturalist 78:87-92.

USDA. 1990. Land and resource management plan. Deschutes National Forest. Bend, OR.

USDA Forest Service and USDI Bureau of Land Management. 2001. Record of Decision and Standards and Guidelines for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measures Standard and Guidelines. Portland, Oregon.

USDA Forest Service and USDI U.S. Fish and Wildlife Service. 1990. A Conservation Strategy for the Northern Spotted Owl. Report of the Interagency Scientific Committee To Address the Conservation of the Northern Spotted Owl. Pp. 1, 19.

USDA Forest Service. 1994. Volume III: Eastside Forest Ecosystem Health Assessment. Forest Service. Pacific Northwest Research Station. Wenatchee, Washington.

USDA. 1994a. Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl: Standards and Guidelines for Management of Habitat for Late-Successional and Old-Growth Forest Related Species within the Range of the Northern Spotted Owl.

USDA. 1994b. Deschutes National Forest Wildlife Tree and Log Implementation strategy. Deschutes National Forest. Bend, OR.

USDA Forest Service. 1995a. Metolius watershed analysis. Sisters Ranger District, Deschutes National Forest, Sisters, Oregon.

USDA Forest Service. 1995b. Trout Creek Watershed Analysis. Sisters Ranger District, Deschutes National Forest, Sisters, Oregon.

USDA Forest Service. 1995c. Deschutes National Forest: A Late-Successional Reserve Overview. Forest Service. Deschutes National Forest. Bend, Oregon. 35pp.

USDA Forest Service. 1996. Deschutes National Forest Memo on Northern Spotted Owl Dispersal Habitat. File Code 2670.

USDA. 2000. Forest Service Landbird Strategic Plan. Washington Office. Washington, DC.

USDA. Forest Service. 2009. Whychus Watershed Analysis Update, October 2009. Sisters Ranger District, Deschutes National Forest, Sisters, Oregon.

USDA Forest Service. 2004. Metolius Watershed Analysis Update. Deschutes National Forest. Sisters Ranger District. Sisters, OR.

USDA Forest Service. 2006. In draft. Spotted Owl Database. Deschutes National Forest, Bend, OR.

USDA. 2012. Deschutes National Forest Management Indicator Species Habitat Assessment. Deschutes National Forest. Bend, OR.

USDA Forest Service. 2013. Whychus Creek Watershed Analysis Update. Sisters Ranger District, Deschutes National Forest, Sisters, Oregon.

USDA Forest Service, Deschutes and Ochoco National Forests. 2014. Joint Terrestrial and Aquatic Programmatic Biological Assessment August 2010-August 2013 For Federal Lands within the Deschutes and John Day River Basin's Administered by the Deschutes and Ochoco National Forests.

USDA Forest Service, USDI Fish and Wildlife Service, USDI National Park Service, USDI Bureau of Land Management, NOAA National Marine Fisheries Service, and Environmental Protection Agency. 1993. Forest Ecosystem Management: An Ecological, Economic and Social Assessment: Report of the Forest Ecosystem Management Assessment Team. Portland, Oregon.

U.S. Fish and Wildlife Service. 2002. Birds of conservation concern 2002. Division of Migratory Bird Management, Arlington, Virginia. 99 pp. [Online version available at http://migratorybirds.fws.gov/reports/bcc2002.pdf

USDI Fish and Wildlife Service. 1992a. Final Draft Recovery Plan for the Northern Spotted Owl, Volumes 1 & 2. Portland, Oregon.

USDI U.S. Fish and Wildlife Service. 2011. Revised Recovery Plan for the Northern Spotted Owl, (*Strix occidentalis caurina*). U.S. Fish and Wildlife Service, Portland, Oregon. Xvi+258 pp.

USDI U.S. Fish and Wildlife Service. 2012. Final Designation of Critical Habitat for the Northern Spotted Owl (*Strix occidentalis caurina*). Federal Register Volume 77, Number 233 (Tuesday, December 4, 2012) Rules and Regulations FR Doc No: 2012-28714. Pages 71875-72068. From the Federal Register Online via the Government Printing Office at http://www.gpo.gov/fdsys/pkg/FR-2012-12-04/html/2012-28714.htm

Volland, Leonard A. 1985. Plant Associations of the Central Oregon Pumice Zone. USDA Forest Service, Pacific Northwest Region. R6-ECOL-104-1985. 138 p.

Waters, J.R. and C.J. Zabel. 1995. Northern flying squirrel densities in fir forests of northeastern California. Journal of Wildlife Management 59(4):858-866.

Waters, J.R., K.S. McKelvey, C.J. Zabel, and D. Luoma. 2000. Northern flying squirrel mycophagy and truffle production in fir forests in northeastern California. Gen. Tech. Rep. PSW-GTR-178. Arcata, CA. USDA Forest Service, Pacific Southwest Research Station.

Wisdom, M.J., R.S. Holthausen, B.C. Wales, C.D. Hargis, V.A. Saab, D.C. Lee, W.J. Hann, T.D. Rich, M.M. Rowland, W.J. Murphy, M.R. Eames. 2000. Source habitats for terrestrial vertebrates of focus in the interior Columbia basin: broad-scale trends and management implications. Gen. Tech. Rep. PNW-GTR-485. Portland, OR. USDA Forest Service, Pacific Northwest Research Station. 3 Vol.

Appendix 2. Wildlife Project PDC Compliance Checklist.

Project Design Criteria Compliance Checklist **(attach to BE/BA)**	**Applies to project (Yes/No)**	Project Complies **(Yes/No/NA)**
Spotted Owl (all land allocations)		
A.1. Do not work disruptively w/in ¼ mile (1 mi. for blasting) of spotted owl activity center 3/1-9/30	N	NA

Project Design Criteria Compliance Checklist **(attach to BE/BA)**	**Applies to project (Yes/No)**	Project Complies **(Yes/No/NA)**
A.2. Do not work within restriction period unless emergency work is warranted	N	NA
A.3. Do not remove hazard trees unless DWD needs are met in project area as in LRMP or LSRA	Y	Y
A.4. Only remove hazard trees if they pose a liability to recreation residences, private landowners, campgrounds, or special use permittees	N	NA
A.5. Survey projects with NRF to Regional Protocol or implement seasonal restriction	Y	Y
A.6. Use smoke management forecasts in order to minimize smoke entering into suitable habitat	N	NA
A.7. Options for reducing hazards trees should be explored: topping, closing or moving sites, etc.	N	NA
Spotted Owl (CHU's, LSR's, and Core Areas)		
B.1. Do not remove, downgrade, or degrade constituent elements of critical habitat	N	No
B.2. Promote LSOG conditions where plant associations are capable of sustaining NRF	N	NA
B.3. DWD objectives are met by plant association as described in the desired LSR condition	N	NA
B.4. Stands not capable of becoming NRF should be managed to provide for dispersal habitat	N	Y
Spotted Owl (Matrix)		
C.1. Maintain 100 acres of NRF habitat (core area) around all known activity centers	N	NA
C.2. Maintain all late-successional patches in fifth field watersheds currently comprised of 15% or less late-successional forests	Y	Y
C.3. Maintain dispersal habitat between 100-acre core areas and LSRs	N	NA
C.4. Maintain all existing NRF habitats for connectivity	Y	NA
C.5. Promote climatic climax LSOG habitat in plant associations capable of sustaining NRF habitat	Y	NA
C.6. On lands not capable of becoming NRF promote that development of habitat for other LSOG dependent species	Y	Y
C.7. Maintain 100 acres of NRF habitat (core areas) around all newly discovered activity centers	N	NA
Oregon Spotted Frogs (Sites and CHU)		
(1) Project could significantly alter the structure and function of the wetland, pond, channel, lake, oxbow, spring, or seasonally flooded areas morphology, geometry, or water availability/permanence by:	N	NA
(a) Filling or excavation; channelization; impoundment	N	NA
(b) Road and bridge construction; urban, agricultural, or recreational development	N	NA
(c) Mining and dredging	N	NA
(d) Groundwater pumping	N	NA
(e) Construction or destruction of dams or impoundments	N	NA

Project Design Criteria Compliance Checklist **(attach to BE/BA)**	**Applies to project (Yes/No)**	Project Complies **(Yes/No/NA)**
(f) Water diversion or withdrawal	N	NA
(g) Hydropower generation	N	NA
(h) Livestock grazing	N	NA
(i) Beaver removal	N	NA
(j) Destruction of riparian or wetland vegetation	N	NA
(k) Pond construction	N	NA
(l) River restoration, including channel reconstruction, placement of large woody debris, vegetation planting, reconnecting riverine floodplain, or gravel placement	N	NA
(2) Project could significantly alter the vegetation structure:	N	NA
(a) Removing, cutting, burning or planting riparian vegetation	N	NA
(b) Creation or maintenance of recreational developments	N	NA
(c) Agricultural activities	N	NA
(d) Grazing	N	NA
(3) Project could significantly degrade water quality, chemistry or temperature:	N	NA
(a) Release of chemicals or biological pollutants into surface water or into connected ground water	N	NA
(b) Livestock grazing that could result in sedimentation, urine, or feces in surface water	N	NA
(c) Runoff from agricultural fields	N	NA
(d) Application of pesticides (including aerial overspray)	N	NA
(4) Project could directly or indirectly result in introduction of nonnative predators or vegetation, increase the abundance of extant predators, or introduce disease	N	NA
(a) Introduction or stocking of fish or bullfrogs	N	NA
(b) Movement of water, mud, wet equipment, or vehicles from one aquatic site to another	N	NA
(5) Project could physically block aquatic movement corridors	N	NA
Oregon Spotted Frogs - Water Drafting (Sites and CHU)		
(1) Water drafting areas can only occur in streams that are at least 10 cubic feet per second (cfs). Avoid shallow areas of ponds or lakes.	N	NA
(2) Water intakes must meet NFMS fish screen criteria	N	NA
(3) Water drafting only applies to short-term water withdrawals defined as those occurring less than 8 hours/day, not longer than 3 consecutive days, and less than 10% of the volume removed where the volume is measured at the time of the withdrawal	N	NA

Project Design Criteria Compliance Checklist (attach to BE/BA)	Applies to project (Yes/No)	Project Complies (Yes/No/NA)

Did we implement PDC, recommendations, or minimization measures per the BA?	
Were the PDC and/or recommendations effective relative to the effect conclusions?	
What, if any, PDC, recommendations were particularly difficult to implement?	
Is there a need to modify or create a new PDC to address a new or existing issue or impact?	

Appendix 3. Spotted Owl Baseline Project Monitoring Form for NLAA Program Activities.

Spotted Owl

Project-level effects as determined by: Barbara Webb_____ Date_Jan 2016_____

Biological Evaluation__X_ **Biological Assessment__X____** **Programmatic Version_2014_**

Forest Deschutes **District__Sisters_____** **Geographic Area_____**

Project Name____Melvin Butte_____ **Program Type_____Timber_____**

Project Type ___Timber Sale_____

None Informal

Consultation (circle one)

Total Project Acres __4,135_____

Land Allocation	Total Acres Project Area	Planned Habitat Effects	
		NRF Degrade (Remains NRF)	Degrade Dispersal
NW Forest Plan			
AWD	NA	0	0
LSRname:	NA	0	0
LSRname:	NA	0	0

CR	NA	0	0
Matrix (alt 3 and 2 respectively)	1859-1883	0	1859-1883
Critical Habitat			
CHU#:	NA	0	0
CHU#:	NA	0	0
CHU#:	NA	0	0
TOTAL	1859-1883	0	1859-1883

Total as of (date):

Total as of (date):

Land Allocation	**Actual** Habitat Effects		**Actual** Habitat Effects	
	NRF Degrade (Remains NRF)	**Dispersal Degrade**	**NRF Degrade** (Remains NRF)	**Dispersal Degrade**

NW Forest Plan				
AWD	0	0	0	0
LSRname:	0	0	0	0
LSRname:	0	0	0	0
CR	0	0	0	0
Matrix	0			
Critical Habitat				
CHU#:	0	0	0	0
CHU#:	0	0	0	0
CHU#:	0	0	0	0
TOTAL				

Describe the purpose of the project.

Provide fuels reduction and defensible space

Describe the purpose of treating NRF habitat?

Not treating NRF

Describe the purpose of treating dispersal?

Ladder fuels reduction by thinning from below.

Did the project achieve your objective?

Project Completion Date:_____ Signature:_____